PLASTICS & MOLDED PRODUCTS

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Reg. U. S. Pat. Off.

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PLASTICS PUBLICATIONS, INC., PUBLISHER

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the American Stove Company Uses

A·R·C Molded Parts

on their new line of modern gas ranges

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Pioneer---

If You Are Looking For Profit

By Prescott Huidekoper
President, American Insulator Corp.

IN this day of profitless prosperity we are often surprised to learn of corporations whose profits exceed all previous records. When facts like these stare one in the face it is just good common sense to ask "Why?" and "How?"

A study of company earnings for 1930 shows in nine cases out of ten, the company whose earnings broke records was the company who *pioneered!* For example, a new and improved product introduced with a daring advertising campaign netted an unusual profit in a field which was considered very hopeless.

An intensive study of men, methods and materials has been under way for over a year. Some fortunate companies arrived at certain fundamental facts many months ago. Acting with courage and foresight they put these facts to work for them. In other words, they pioneered — and their reward was *profit* in a time when profit was doubly welcome.

It is not necessary to go out into the wilderness to pioneer. There is more adventure in our industrial centers than ever before. For, today, the gold mines of America are her manufacturers. A new executive may effect manufacturing or selling economies greater than the production of a small gold mine.

A new method of manufacture or distribution may mean the difference between profit and loss. The use of a new material may mean the difference between dominant leadership and bankruptcy.

Mr. Prescott Huidekoper

The history of the molding industry is a history of new methods and new materials. In the past it has been a case of the demand creating a supply. For instance the vastly increased use of electrical equipment created a demand for efficient low-cost insulators of varied size and complicated shape. This demand created and built up the cold molding industry.

Then came the introduction of phenolic molding material—the material of a thousand uses. New uses were found for this material which saved money. In fact so fast were new applications discovered that before two years had passed the slogan, "The material of a thousand uses" was obsolete and the symbol signifying infinity added.

Today, industries which never were considered possible users of molded products are using

millions of pieces. The current Chesterfield advertising tells us "You never know until you try". This is true of molded parts. And it is an interesting fact that the individual companies who pioneered in using molded parts in their field have almost invariably profited.

New industries have been large users of molded products. Every automobile, radio set, and airplane has from two to forty molded parts. The electrical industry uses countless millions of molded parts. In fact the use of molded products is more widespread and it is difficult to name one industry which does not rely to some extent on the custom molder. A look around your home will surprise you. Dozens of molded products are around you — switch plates, radiator control valves, stove handles—it is possible to note over a hundred such applications in a single home.

The past has proved the utility of molded products. But what of present and future? Is there a saturation point, and if so, how far away is it? The answer to these two questions is intimately connected with business conditions as a whole.

Business today is interdependent. When sales decrease for one industry many other industries feel the effect. These in turn influence still other industries. If one looks at business in general and then draws conclusions from this birds-eye view, the picture is liable to be depressing. But out of a mass of glittering generalities there stands one specific fact that is a challenge. In spite of conditions there are always individual companies who from a net profit viewpoint stand head and shoulders above their competitors.

These profit-makers are not confined to a single field or industry. What is even more important, they are not limited by size or location. And the fact that there are a large number of depression-proof profit-earners proves that it is not chance or luck that puts them where they are.

That these companies are *pioneers* is easily proven. But what, you ask, has this to do with molded products? Just this—*new molding materials and new molding methods have made so many advances in the past two years that there is no industry in America today, which offers such tremendous possibilities to the pioneering manufacturer as does the molding industry.*

This is taking in a lot of territory but, as Al Smith says, let's look at the record. No one questions the fact that the present depression presents a major sales problem to all of industry. In fact conditions as they are today and as they will probably continue to be for some time are entirely due to sales (or lack of sales) factors. There is an enormous accumulation of money in the banks, there are millions of people ready and able to buy and there is ample material and production facilities available to produce the goods the people would buy if, and here is the crux of the situation, they could be attracted, interested and their desire stimulated.

Advertising authorities agree that the force of modern advertising and merchandising campaigns are only fully effective when the product offers real value. Every plan starts with the product and its packaging and ends when the ultimate consumer has bought it, used it and is satisfied.

If this be true, and there are innumerable cases to prove it *is* true, then step one for the pioneer-type manufacturer who is anxious to increase his business is to call in the sales engineers of a progressive custom molder and let them study his product and its container.

For example the sales engineers of American Insulator Corporation are often called into consultation by manufacturers who are confronted with unusual sales problems. As a result of the study made by these men, assisted by a specially organized merchandising division, they are able in many cases to offer suggestions which result in adding attractiveness and value to a product or its container.

These sales engineers are familiar with the new light colored molding materials, Lumarith and Beetle, which we use extensively. Lumarith for instance, is a new cellulose acetate molding material which offers an unlimited color range in transparent, translucent or opaque colors. Costly materials such as jade, onyx and marble are imitated at a fraction of the cost of the genuine material.

New color effects are obtainable in Lumarith which are so attractive that they add immensely to the saleability of the product of which they are part.

Beetle material has been found ideal for tableware, and the Beetle whoopee cups have

(*Continued on page 238*)

By revitalizing their products with the use of light-colored molding materials, rejuvenating them with standard colors, pioneering manufacturers have found the way to profits

Production Problems in Pyroxylin Plastics

Does it pay to sell "seconds"?

By C. Stark
Charlottenburg, Germany

We are pleased to submit to our readers original authoritatively written articles by a new German correspondent whose aid we have enlisted in the furnishing of material for Plastics and Molded Products.

Mr. Stark is an acknowledged expert in the plastics field and is particularly familiar with cellulose esters and their plastics. He has been active, since the completion of his technical education, as manager of the Nitrate Cellulose-Pulver und Celluloidfabrik of the Rhenish Westphalian Explosives Corporation, at Cologne, from 1904 to 1911; during 1911 to 1914 he was one of the directors of the celluloid and celluloid goods factory of Johann Arns Company, at Krefeld; 1914-1916 a director of the West Deutschen Celluloid Werke GmbH; from 1916 to 1919 a director of the Espagit Explosives Company at Losheim; and from 1919 to 1927 a director of the Westphalian Anhalt Explosives Company at Berlin, having built the celluloid, nitrocellulose, and plastics plants of the latter company. Since 1927, Mr. Stark has been active as a consultant manufacturer and engineer and has written numerous articles for the technical press. He is also consultant for a number of plastics factories in Europe. We are certain that our readers will find his articles, which deal with the technical as well as practical phases of plastics manufacturing and merchandising, of more than passing interest.

THE real question concerning us is this, "Is it advantageous to sell the the unavoidable waste and production of seconds during the manufacture of celluloid, to be sold as such, at whatever prices can be obtained therefor, or is it more advantageous to re-work the material into another or darker color and thus convert it into first-quality goods so that the price can be maintained?" Before this question can authoritatively be answered, it is necessary to look somewhat into the industry so as to ascertain and suggest what is meant by the term "seconds" and waste.

Human Factors

The manufacture of pyroxylin plastics or celluloid, as it is now almost universally known the world over, involves a great many different phases, during any of which possibilities are presented for lowering the quality of the finished goods. Although in most modern factories the greater part of the manufacture is carried out purely mechanically, there are nevertheless such human factors as will affect, adversely or otherwise, the goods being turned out from day to day. Let us consider first, therefore, the raw material from which pyroxylin plastics are produced:

Collodion cotton is made from cotton linters by nitration. The nitrated product is boiled a number of times, washed and then bleached. Even during the choice of the raw cotton, considerable experience and care is necessary because a poor quality cotton cannot be expected to yield a first-class pyroxylin plastic. While some types of cotton are good enough for dark qualities or colors of celluloid, others are required when a pure white or well-colored product is desired. Then again, one type of cotton linters is particularly amenable for conversion into transparent celluloid, while another type is particularly suitable for molding by the internal steam expansion process, this being particularly characterized by its ability to form a strong and permanent weld. The composition of the nitrating acid, the temperature thereof, the duration of the nitration, the methods and length of time of bleaching, as well as the clearness of the cotton are all points which must be considered when manufacturing collodion cotton of the right quality for conversion into pyroxylin plastics.

Camphor and pulvering materials must also be subjected to refining treatments. They must be dissolved in alcohol and filtered; they must be adjusted relative to each other by weight.

We can thus see that in the preparation, even of the raw materials, there are numerous operations, any of which if improperly performed would lead to the production of faulty goods and hence to inferior quality product.

Compounding

Then there follows the composition and manufacture of the pyroxylin plastic itself. Let it be assumed that the proper material has been supplied in the right quality and quantity and that all of the various people in charge of the product from start to finish have done their work correctly. The material is then transferred from the kneading machines to the rolls and then to the filter presses, where it is clarified, after which it is again put on the rolls, then formed into blocks, and finally

passed to the slicing machines which produce the sheets, which are then put into dry storage. During these operations, particularly the slicing or sheeting, the mass still contains alcohol, being slightly damp, and therefore very susceptible to dust and other impurities with which it comes in contact; even the sweat on the fingers of the workmen often produce finger marks which are difficult to remove, so that even with the greatest care and attention, dirty goods cannot always be avoided. This condition is particularly noticeable in the case of white and transparent products and with the lighter or pastel colors.

When slicing sheets from a block, there is always a certain number of sheets which are not of the standard thickness required. The initial cut and the residue left on the cutting table also produce seconds and sometimes even waste. In the best conducted normal manufacturing operations, one can safely count on a loss from this source of from 8 to 10%. This is only taking a few cases, and it often happens that a good portion of a block which may weigh from 240 to 400 lbs. will eventually appear in the form of seconds or inferior quality or waste.

Other Causes

It is also not impossible and, in fact, the writer has often seen it happen that, despite the greatest of care, entire pressed blocks do not come up to the requirements of first-class material; for instance, products intended to be transparent have turned out cloudy, this being due perhaps to not completely soluble collodion cotton, the formation of strains or flocculation, or the addition of coloring matter or plasticisers of insufficient purity. Quite often, material intended to be white does not have the exact shade that has been ordered, which, especially when the material is used welded together with colored material, is very undesirable and leads to rejects. Sometimes it happens that the transparency of the material is such that when only one millimeter thick it is of the same color as the better grade material four to six millimeters thick, which, of course, is very undesirable. In this case also the uniformity of the collodion cotton used is very important, and the best procedure is to make these products from the selfsame lot of collodion cotton, as hardly any two lots of the latter are exactly alike.

Another difficulty is that goods made to order and intended to match a certain color do not match the same sufficiently to meet the specifications of the customer. What may cause this is difficult to explain at times, and to go deeply into it would be beyond the scope of the present article.

A further cause for the production of seconds is the failure of the proper welding of added materials such as ivory, and the failure of the proper welding of different colored goods which are intended to imitate tortoise shell and similar mottled products. In some cases the defects are due to errors in the choice of raw material, and still more often in the failure of the machinery to function properly, and sometimes is due to the injudicious choice of the temperatures or pressures used. It takes a real expert to determine, in some cases, what was the cause of the difficulty. Moreover, such an expert can often greatly diminish the loss to the plant if he is particularly cognizant of the requirements of the customers of the factory and also is well versed in the working up of colored goods. For instance, material which is only slightly filled or wetted can still be converted into useable products by cutting the same somewhat heavier and adopting it for another purpose; for example, material which is somewhat too brittle, and hence is not saleable in thin sheets, may be cut into comparatively thick slabs and still be sold as first-class product for the latter purpose. Needless to say, all this requires much experience and close contact with the trade, and particularly knowledge of which sizes and thicknesses are saleable. Only in such a manner is it possible to prevent the accumulation of goods which do not move as rapidly as they should.

However, there are some cases where a whole block weighing about 400 pounds is of such color or quality that it cannot be sold as first-class goods. Then arises a rather neat problem with which the question first stated particularly deals. It cannot always be answered as a curbstone opinion, and actual practice during the last ten years has shown that no two factories approach the problem in the same way.

The Best Course

One manager will say, "It is purely a matter of calculation", but there is much more to it than this, as a further discussion will show.

Dealing purely from a point of calculation and looking no further than the factory sales, there appears to be no question that the figures would show an advantage in the sale of the seconds at a lower price. For instance, consider the fact that actual waste on the average cannot be sold for more than 40 cents per kilogram, while seconds can usually be sold by merely reducing the sales price from 25 cents to 50 cents per kilogram, so that the seconds will bring on the average from $1.00 to 50 cents per kilogram. Now, assuming that the daily production of the plant is 5000 kilograms and that 15 per cent of the goods turned out as seconds. This would make a loss of 750 kilograms or a minimum of $375.00 per day, which is no mean sum when contrasted with the total value of the output.

Sometimes it is so difficult to judge whether a certain batch of goods is first or second quality that only the kicks coming in from the customers determine the matter. Often these kicks are made purely for the purpose of cutting down the price, and many times they are entirely unjustified. To the

manufacturer this is a real difficult and mean problem.

Some firms have taken the view, and have actually tried it out in practice, that the best scheme is to test all material before sale and absolutely refuse to sell anything except first-class goods, and not to sell seconds under any circumstances. Such firms follow a policy of actually taking back the goods objected to rather than to make a discount. There is some real sense to this, because it is perfectly obvious that if a customer starts using second-grade material, he is buying just so much less first-class goods, in which the real profit lies. There is, however, a much greater economic reason for this, and that is that the fabricator by buying seconds is able to produce an article of commerce at a lower price than the competitor who uses only first-class goods. Such a fabricator, instead of making the extra profit, immediately starts cutting prices until the condition arrives that fabricators using first-class goods can no longer compete, because the public expects to buy the product at a price entirely unrelated to the real value of the goods. We remember, during the last few years, several such actual cases, which are mighty instructive.

Effects of Lowered Standards

At the beginning of the present century, one factory, which was very poorly equipped mechanically, manufactured only pyroxylin plastic rods. Just at that time transparent and other pyroxylin plastic umbrella and cane handles, imitation coral beads, and pipe, cigar and cigarette tips were in vogue, and the rods were, of course, particularly suitable for such products. The material turned out by the said firm was qualitatively somewhat below standard and for this reason, and perhaps for some others, this firm sold their rods considerably below the standard market. The natural result was that the finished articles soon appeared on the market at such a depreciated price that, from that time on, manufacturers have never again been able to get a price commensurate with the value of first-class goods, with the result that large factories now pay little attention to this which formerly was a good consumers' trade.

Another example was furnished by a plant that produced a pyroxylin plastic with a cheap camphor substitute instead of with genuine camphor, so that the product was insufficiently plastic and elastic to produce cap visors and toys made by internal steam expansion. They sold their goods in job lots, and somebody bought them and started making trays as advertising novelties. The success of the trays caused a demand for low priced goods, which eventually so reduced the price that for the last twenty-five years hardly any fabricator can make more than a bare living from producing such goods.

Tortoise Shell

Another comparatively well known case was the manufacture of extremely cheap imitation tortoise shell in France during the years 1908 to 1914. This product was made entirely from waste and, because of the very low tariff then in effect, was imported in huge quantities into the United States. There it was worked up into hair ornaments, mainly sold to children, while other huge quantities were sent into the Balkans and the Far East. The result, of course, was a great drop in the price for such articles, and even to this day imitation tortoise shell, even when made from the best material, is not a good line for profit.

We have often found this to be a fact, that when the fabricators find that they can no longer get the cheap material, they will simply stop making this line of goods, and the result is that the market disappears altogether.

It is, therefore, quite evident, as shown by these examples, that it is very dangerous to sell seconds or lower quality goods, or job lots or other junk, for even though there may be an immediate profit in realizing on the manufactured material, the damage to the market in general will never make up for such temporary success.

This also affects the finished articles, because the finished article, if not up to standard in appearance, is sometimes not readily distinguished by the public from first-class goods; and when the public sees pyroxylin plastic articles on the market at a low price, it simply refuses to buy the good quality material, which it cannot distinguish, at a decent price, and the result is: a further depression in the price of good grade raw pyroxylin plastics. Shortly after the war was over in Europe, several of the larger plants making raw celluloid came to the conclusion that the only way to save the business was to manufacture and sell nothing but standard first-class goods. Thus, fabricators which were large enough and strong enough financially to make their own goods or to contract with the factories for much of the output, of course had a great advantage. It thus became possible that large celluloid blocks, even though they had slight defects, could often be bought as such and cut up by the fabricator into desired thicknesses suitable for fabrication into such products for which they had orders. This obviated, to a great extent, the cutting of prices to the jobber and consumer.

Price Levels Maintained

There have been a few exceptions to this, and those have been the market prices of molded pyroxylin combs; but as to the other finished articles, the European plants particularly have been able to maintain their prices at fairly constant levels.

We have a number of other articles from Mr. Stark in type. They deal with similar problems.

English harewood, dyed gray by a new method which preserves grain and texture, is combined with ebony-hued laminated resinoid to form a desk for the Bakelite Corporation reception room. The smoking table also has a laminated resinoid top. Telephone, buzzer, and ash tray center are of molded resinoid, and the fan blades are shaped from the laminated material. Furniture designed by Huller Co., Inc.

Laminated Plastics

Dominate With Wood and Metal in Modern Furniture Design

NEW materials and new lines are preeminently symbolic of the modern decorative movement. The new materials are those having their origin in the chemical laboratories. Bakelite phenol resinoids typify advance in the synthetic organic field; rare new alloys form the vanguard of metallurgy. The new lines are those of simplicity—keynote of modern design.

Adoption and effect of new materials and simple lines are evident particularly in modern furniture, which, as in previous periods, is influenced by the architecture of the day. The skyscraper, symbol of the present era, depends upon new or greatly improved construction materials for strength, and finds beauty in unadorned structural design. There is little applied ornamentation. This is true also of modern furniture.

The effect is of extreme simplicity, realized by the use of flat surfaces and strong, unbroken lines. Beauty depends upon the inherent excellence of the material, and upon good proportions and perfect finish. Moldings and carvings are eliminated.

Reduction in ornament has caused an increase in attention paid to color and surface. Contrasts in color are used, and sharp contrasts in light and shadow are created. Variation in surface quality and texture is made possible by the employment of new materials. Never before has the artist had so many interesting substances with which to work. For this situation, due credit must be given to the research chemist, who has developed the synthetic resins, the untarnishable alloys, the Celanese and Rayon fabrics, the heavy glass known as Vitrolite, which comes in black and colors, and the new processes for chromium plating metal and manufacturing jewel colored mirror. Imitation is avoided. A material is chosen for its individual characteristics, not because of its resemblance to something more rare or costly.

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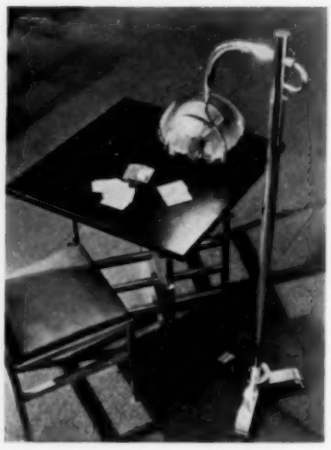
The coffee table, designed by Eugene Schoen, has segment shelves in black laminated resinoid, and a supporting frame in a combination of bronze and Monel metal.



Reprinted from "Bakelite Information."

The wood used with these products of the laboratory is being treated in a fresh and interesting manner. Modern craftsmen are endeavoring to preserve the natural beauty of wood. In its original state, color, grain, and surface give it individuality. These qualities are lost when paint and lacquer are applied. The wax finish, oldest of all known wood coverings, remains most satisfactory, but a new process of coloring has been developed, offering

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Typical of the work of modern artists who believe in functional design. The table, with Formica top, may be adjusted for coffee or bridge. The lamp may be used for bridge, or turned upward for indirect lighting. There is nothing on either table or lamp which does not perform a function. The small loop of hollow tubing at the top of the lamp standard is primarily to prevent the wire from twisting. Designed by Donald Deskey.

"These new materials are expressive of our own age. They speak in the vernacular of the twentieth century. Theirs is the language of invention, of synthesis. Industrial chemistry today rivals alchemy. Base materials are transmuted into marvels of new beauty."

Paul T. Frankl, in **FORM AND REFORM**

Laminated resinoid becomes a structural necessity in this ingeniously designed card and dining table. When closed, one-half of the table top rests upon the other half. The tops must be thin—three-fourths inch thick—and must not warp. The required lightness is obtained, and danger of warping prevented, by the use of Formica. Designed by G. Rohde.

some advantages over ordinary staining and finishing methods. The wood is dyed with special dyes which penetrate the grain. In this method the pores are not clogged by pigment and some of the life of the grain is preserved.

But in spite of improvement in finish and the addition of new and rare woods to the familiar varieties, phenol resinoids and metals are now competing with wood as furniture materials of the future. Tables with gleaming metal bases and lustrous tops of laminated resinoid—known under trade names such as Formica—represent a distinctive feature of the present mode. The resinoids hold a unique position in the realm of decorative design because they couple beauty with remarkable utility. Bakelite table tops withstand "the years, the drinks, and the cigarettes." In high or dull finish, black or colors, these tops offer a perfect contrast to their frame-work of aluminum or steel in flat strips or slender tubing.

Of all the new materials used in modern decoration, Bakelite phenol resinoids are among the most interesting in source and versatility. They are produced by the union of such commonplace materials as phenol and formaldehyde. Reacting at suitable temperatures, these two chemicals yield clear, amber-hued solids, described as *resinoids* because they resemble natural resins in some physical characteristics, and yet in constitution and most properties are distinctly different. First developed for industrial purposes, the resinoids now seem equally adaptable for mechanical or decorative use.

For manufacture of the laminated material, the initial resinoid is dissolved in solvents to provide a varnish. Sheets of paper, linen, or canvas are then impregnated with the resinoid solution and dried. After drying, a large number of these sheets are superimposed and subjected to heat and pressure. The result is a hard, dense, rigid plate.

Although the laminated form of Bakelite resinoids is now replacing wood in furniture and wall panelling, it is not to be considered a wood substitute. It has its own individual characteristics which give it a separate entity and assure it a permanent place in the lists of furniture and decorative materials. The most important of these qualities, from the viewpoint of the contemporary designer, are lightness, strength, and a beautiful distinctive finish, resistant to fire and stain.

Following the principle of using laminated resinoid at points of hardest wear, a dull finish Formica covers the front rail of this lounging chair. The sides and back are of lacquered wood, edged with chrominum plated steel. This design illustrates the use of flat, undecorated surfaces and unbroken lines. The table has legs of polished chromium plate on steel and a reversible top covered on both sides with Formica. Designed by G. Rohde.

A smoking table, from the S. P. R. Galleries, shows the modern tendency to use geometrical designs. The supports are of wood, with shelves of red Formica.

Technology of Cellulose Acetate

Progress in the Preparation of this Cellulose Ester as Shown in the World's Patent Literature during the last Decade

By Dr. Aladin

Last month began this most exhaustive review of the technology of cellulose acetate as it has developed during the past ten years. The author is now so well known to our readers that he needs no further introduction. We are highly pleased that we have been selected by him to be the first to publish these reviews, which in themselves form a reference library on the subjects to which they apply. While ordinarily not light reading, we know quite a few instances where they have saved research workers and manufacturers thousands of dollars in needless work, for they could readily ascertain what had already been done in the field in which they were working. Such reviews as this are to the investigator and developer of an industry what the latest maps are to the explorer.

There are to be 235 patents in all in this review—covering all countries.

AS already stated the preparation of the chloroform-soluble primary cellulose triacetate is not the principal object in producing a commercial product, for it is desirable to produce a technically useful product, which after removal of the solvent will have certain requisite properties. This is accomplished by a process of saponification, the degree to which this is carried out being determinative of the properties of the final acetate produced, and the use to which it is to be put. Though many attempts have been made to achieve a cellulose acetate initially of a lower stage of acetation, this has not as yet successfully been accomplished. This saponification is practically synonymous with hydrolysis, and is usually brought about by addition to definite amounts of water directly to the acetated product while it is still in the acetating bath. The first effect is the hydrolysis or saponification of the residual acetic anhydride to acetic acid, whereupon the water effects a somewhat similar result upon the triacetate. However, many processes have been described wherein the triacetate, after precipitation and removal from the acetating bath, has been treated with various reagents, usually of an acidic nature, to effect the desired degree of hydrolysis. Some proposals have also been made to control the hydrolysis while the triacetate was still in the acetating bath, by addition of various reagents, catalysts and the like, most of which were of an acid character. The following are contained in the detailed review of the patents to follow hereinbelow.

The testing of a finished cellulose acetate is not so simple a matter, as the determination of the combined acetic acid is not at all a criterion as to its properties. The complete removal of whatever catalysts may have been used is however of the utmost importance, a virtual *sina qua non* for the production of a faultless material. The so-called "ripening" which is a part of the hydrolysis, is a function of the time, and can only be determined and fixed empirically.

A good useable cellulose acetate should not contain more sulfuric acid that would amount to 0.05%. The melting point of the acetate should not be below 220°C., at which temperature it will also turn brown and begin partially to become charred. If the product turns dark or brown

a). Additions to the acetylating bath.

Ferrous sulfate and hydrogen dioxide	B. P. 273,743	No. 196
Hydrofluoric acid	B. P. 303,098	No. 201
Hydrochloric acid	B. P. 273,743	No. 196

b) Hydrolysis of the primary triacetate itself.

1. By inorganic substances:

Dilute phosporic acid	U. S. P. 1,557,147	No. 185
	U. S. P. 1,634,986	No. 187
Mercury salts	U. S. P. 1,723,614	No. 191
Dilute nitric acid	U. S. P. 1,527,876	No. 184
	U. S. P. 1,635,026	No. 188
Nitric + sulfuric acid	B. P. 312,232	No. 203
Dilute sulfuric acid	B. P. 292,398	No. 198
	B. P. 299,326	No. 200
Zinc salts	U. S. P. 1,723,614	No. 191

2) With organic materials.

Cholesterin	B. P. 307,392	No. 202
Gall	B. P. 302,292	No. 202
Naphthalene	B. P. 267,569	No. 195
Tetrahydronaphthalene	B. P. 267,569	No. 195

before this temperature is reached, it is probably due to the presence of sulfuric acid. Another test for the presence of sulfuric acid is that made with methylene blue, which has given excellent results in actual practice. This is carried out by dyeing the acetate to be tested by submerging the same in a 1/100% solution of methylene blue, followed by drying. The product will then appear slightly spotted, i.e., there will be darker portions noticeable. If there are *many* dark spots, this is an indication of the presence of free sulfuric acid, and /or of cellulose sulfo-acetate, either of which are undesirable in a useful cellulose acetate for commercial purposes.

The detailed review of the 235 patents that follows includes the first quarter of the year 1930, and is a complete birdseye view of the improvements made in the field of the production of cellulose acetates during the past ten years. The patents are arranged in the following groups:

I. Apparatus.
II. Pre-treatment of the Cellulose.
  a) Cellulose itself, generally.
  b) with alkalies (and oxidizing agents).
  c) with halogens, inorganic acids and acid chlorides.
  d) with organic acids.
  e) with various other substances.
III. Catalysts
IV. Acetation.
V. Hydrolysis.
VI. Working up into finished products.

The abbreviations before the patent numbers have the following signification:

Aust. P.=Austrian Patents.
B. P.=British (English) Patents.
Can. P.=Canadian Patents.
F. P.=French Patents.
Norw.=Norwegian Patents.
Swed. P.=Swedish Patents.
Swiss P.=Swiss Patent.
U. S.=United States Patents.

The patents in each group are arranged in the following order: U. S.; Canada, Germany, British, French, Dutch (Holland), Austria, Norway and Switzerland. A numerical index will complete the article, so as to enable our readers readily to find any of the patents which they may have noted during a search. We hope to continue to bring a substantial part of this review each month, and to complete it in 1931.

I. APPARATUS

Serial No.	Patent No.	Patentee	Title	Brief of Description
1.	U. S. 1,566,398	Societe chimique des Usines du Rhone (N. B. Grillet)	Preparation of cellulose esters and ethers.	A rotary vessel provided with pebbles or balls (ball mill) is used to secure better admixture of the products. The rotating drum is mounted below a sprayer through which hot or cold water can be applied to the drum to control the temperature of its contents.
2.	U. S. 1,711,941	Eastman Kodak Co. (H. L. B. Gray)	Preparation of cellulose esters.	Cellulose is treated in a closed vessel under vacuum with an acetating mixture containing chloroform or other inert solvent, which evaporates, thus displacing all the air in the apparatus. The acetation then takes place at ordinary atmospheric pressure.
3.	B. P. 231,837 (Jan. 24, 1925)	Societe chimique des Usines du Rhone (N. B. Grillet)	Preparation of cellulose esters and ethers.	See U. S. P. 1,566,398 (No. 1).
4.	B. P. 270,656	Societe chimique des Usines du Rhone (N. B. Grillet)	Preparation of and apparatus for cellulose acetate.	See F. P. 615,879 (No. 11).
5.	B. P. 274,814 (Apr. 6, 1927)	Societe chimique des Usines du Rhone (N. B. Grillet)	Preparing cellulose acetate.	The acetation takes place in a diagonally mounted rather narrow tube divided into separate divisions by perforated partitions in which there are stirrers. The various divisions may be individually cooled or heated.
6.	B. P. 282,791 (Dec. 28, 1927)	Ruth-Aldo Co., Inc. (N. L. Barthelemy)	Preparing cellulose acetate.	Cellulose is acetated in a rotary cylinder which rotates about an axle which is at an angle to the longitudinal axis of the cylinder.
7.	B. P. 303,099 (Aug. 3, 1928)	Ruth-Aldo Co., Inc. (N. L. Barthelemy)	Preparing cellulose acetate.	The acetation is carried out in a vessel provided with eccentric stirrers.

Serial No.	Patent No.	Patentee	Title	Brief of Description
8.	B. P. 303,485 (Feb. 8, 1928)	Society for Chemical Industry	Preparation of cellulose esters.	An acid proof rotary vessel is used. Baffles exert a mixing effect on its contents.
9.	B. P. 317,088 (Aug. 8, 1929)	Society for Chemical Industry	Preparation of cellulose esters.	The hydrolysis of the primary triacetate is effected in a container provided with agitators as well as with rotatable heating elements.
10.	F. P. 592,423 (Apr. 2, 1924)	Societe chimique des Usines du Rhone	Preparation of cellulose esters and ethers.	See U. S. 1,566,398 (No. 1).
11.	F. P. 615,879 (May 10, 1926)	Societe chimique des Usines du Rhone	Apparatus for and Preparation of cellulose acetate.	In a continuous acetation process there is provided a long vertical tube provided with a vertical shaft bearing various types of agitators and impellers. In the upper part where the cellulose is fed in, the shaft carries hooks for tearing the cellulose. Lower down there are paddles and still lower impellers. The solution of acetated cellulose is withdrawn at the bottom.
12.	F. P. 638,900	Ruth-Aldo Co., Inc.	Preparing cellulose acetate.	See B. P. 282,791 (No. 9).
13.	F. P. 660,377	Ruth-Aldo Co., Inc.	Preparing cellulose acetate.	See B. P. 303,099 (No. 7).
14.	F. P. 662,790	Society for Chemical Industry	Preparation of cellulose esters.	See B. P. 303,485 (No. 8).
15.	Swiss P. 113,353	Societe chimique des Usines du Rhone	Preparation of cellulose acetate.	See U. S. 1,566,398 (No. 1).

II. PRETREATMENT

A. Cellulose, in General

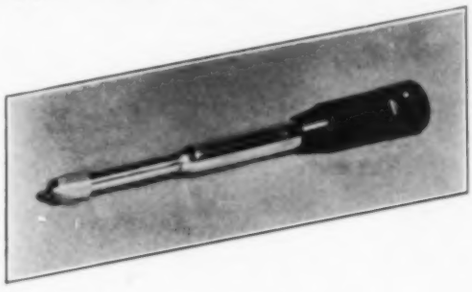
Serial No.	Patent No.	Patentee	Title	Brief of Description
16.	U. S. 1,441,541	W. J. Stevenson	Preparing cellulose acetate.	Bleached sulfite pulp is used as the raw material.
17.	U. S. 1,544,944	Eastman Kodak Co. (P. C. Seel)	Preparing cellulose acetate.	The acetylation is rendered easier and the formation of lumps is prevented by first beating the cellulose in a hollander to form a uniform aqueous paste which is then dehydrated by means of pressure rollers or presses.
18.	Ger. P. 387,685 (Apr. 19, 1918)	R. Müller	Preparation of cellulose esters.	Cellulose suitable for acetation is prepared from a floc-like product obtained by taking boiled or bleached cellulose, removing the water therefrom by centrifugals, and then passing it through a ventilator dryer, followed by sieving to remove too large lumps. The sieve is of the vibrating type.
19.	Ger. P. 400,190 (Nov. 9, 1919)	R. Müller	Preparation of cellulose esters.	Addition to Ger. 387,685 (No. 18). Damp cellulose is dried by passing the same through a spray dryer (transporting-exhauster). The cellulose thus produced is much more quickly acetated and the solutions obtained are free from small fibres.
20.	F. P. 519,840 (Dec. 24, 1919)	R. Müller	Preparation of cellulose esters.	See Ger. P. 387,685 (No. 18).

This review will continue in our next issue with the pretreatment of cellulose by means of alkalies and oxidizing agents.

Quantity Applications Still Call for Black Molded Parts

NOTWITHSTANDING the considerable interest shown in pastel, translucent and transparent molding materials, the standard, dark and opaque colors continue to find new applications which are generally produced on a mass scale. The inherent qualities of the synthetic resinoids as well as the mode of fabricating them, make these materials ever popular with the manufacturer who has an eye for the durability and appearance of his product.

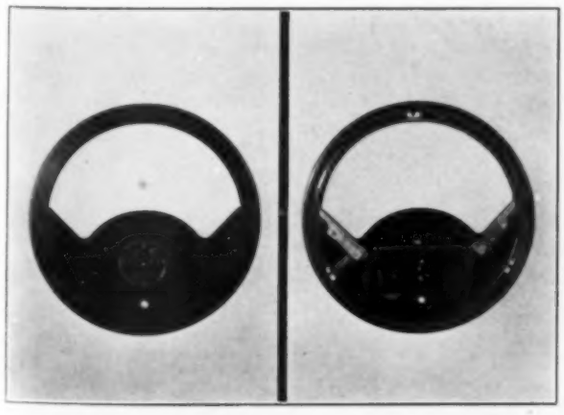
Spring is the time of year when all true disciples of Izaak Walton turn their thoughts to rods and reels. This reel has handle and sides molded out of black Durez, much more durable than the painted wood it replaces.



A handy tool for the handy man—a Goodell-Pratt automatic drill. Eight fluted drill points are contained within the Bakelite molded magazine handle. The glossy ebony finish of the handle affords a nice contrast to the exposed metal parts, which are nickel plated and buffed to give a permanent finish.

With the passing of the ship-model collecting fashion, interest has turned to stage coach models. An enterprising manufacturer uses wheels molded out of Durez in various solid colors.

Recto Manufacturing Co. molds this new card table companion out of black Bakelite. It combines ash-tray, glass holder and a holder for a pack of cards ready for the next dealer.



The molded meter case front is used by the Jewell Electrical Instrument Company to replace black enamelled cast iron. In contrast to the enamelled iron, reinforced molded cases are not attacked by acids, oils, or moisture. The rear view of the meter case shows the perfection of detail possible in resinoid molding operation.

Plastic Molding and Materials

Part II Continued from March Issue

By L. M. T. Bell, A. U. C. N.

Borough Polytechnic Institute, London

IT is useful to consider the application of the data given in the tables to the selection of a class of material for various purposes.

Case I. An insulator is required for outdoor work in the tropics: voltage gradient moderate.

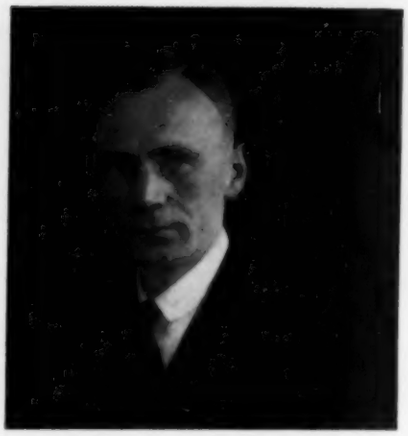
In such a case shellac, synthetic resin and vulcanized rubber compounds would be unsuitable. Copal, hard bitumen, and glazed earthenware insulators should be preferred. If severe frosts are to be faced, porcelain would be viewed with suspicion owing to the danger of the glaze cracking and allowing moisture into the base, which might be slightly porous or absorbent.

Case II.—An insulator is required for domestic service indoors, heat resistance not essential.

Here the choice might fall on shellac, synthetic resin, vulcanized rubber, porcelain, celluloid, or cellulose-acetate compounds. The danger of mechanical shock would eliminate porcelain. Fire risk might result in celluloid being discarded. The need for good appearance would result in all usual asbestos-loaded materials being eliminated and the choice would finally fall on either a shellac, a Bakelite, a urea compound, hard rubber, or cellulose-acetate compound. Cost and design details would decide such final choice and a search for the best market in which to buy the correct type of material would then be made.

Molding Plant

It has been pointed out already that molding differs from casting in that extra pressure is required to form the difficultly plastic materials into the required shapes. Various types of plant are in regular use to supply this pressure and firms are usually emphatic regarding the merits of their own particular type of plant. A greater amount of interchange of thought on this point would be greatly to the benefit of the industry.



Mr. Leslie M. T. Bell

Professor Bell continues his series which began in the March issue of *Plastics and Molded Products*. Based on the lectures given at the above institution, these articles were expressly written for us and will appear in no other publication.—The Editor.

Types of Presses

The presses can be divided into two main types—mechanically-operated and hydraulic presses. Either type can be hand or power-driven. For rapid production hand operation is not good; for experimental work it has much to recommend it.

Mechanical presses are used principally for shock or percussion molding, where the pressure required is supplied in the form of a blow. The moldings made in these presses are generally thermo-plastics or cold molded. Appearance will not be of primary importance. Mechanical presses can be subdivided into two kinds — screw presses and crank presses. Screw presses are always hand operated due to the danger of jamming the thread. A hydraulically-supported bed may be provided to extend the scope of the press.

Crank presses are power driven, the movement being similar to that of a single cylinder motorcycle engine inverted. A heavy flywheel, itself electrically driven, drives a main crank which in turn drives a piston or moving head with a reciprocating motion. The mold is mounted on this and on the bed of the press so that it is closed at the bottom of the stroke and open for extraction at the top. The action being positive, there is a danger of damage being done either to the press or mold if overcharged, or if the composition does not flow correctly. To minimize this the bed is frequently mounted on either rubber or hydraulic buffers, which take the strain.

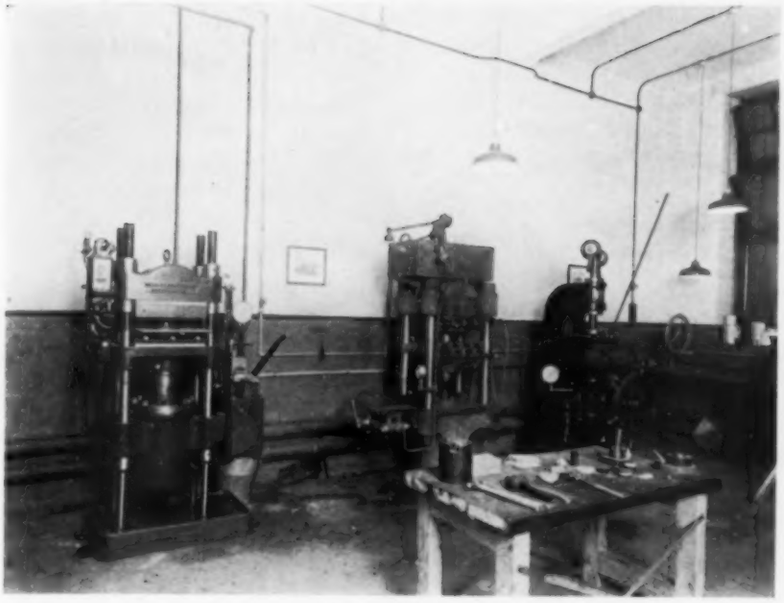
Hydraulic Presses

By far the most important plastic molding presses are operated hydraulically. The ease and simplicity of control, their flexibility and reliability all contribute to this. Five methods of applying hydraulic power are known and widely used:

(1) Hand pump.
(2) Singe-line pressure.
(3) Two-line pressure.
(4) Variable stroke pump.
(5) Intensifier.

In method (1) usually two hand pumps are fitted to a press, one pump to lift the ram to the work at high speed, and the other exerting the final squeeze. The first pump will raise the ram 3/16 in.-1/4 in. per stroke and the second will pump it about one-tenth of this distance, the two pumps being used as desired by the operator.

Method (2). Figure IV. shows the piping diagram of a typical



Types of molding presses in plastic molding laboratory, Borough Polytechnic Institute, London.

single-line pressure system. The pressure used in such a system varies from 700 lbs. to 3,000 lbs. per square inch, 1,500 lbs. to 2,000 lbs. being specially favored because with these pressures the size of the press ram does not assume unreasonable proportions and wear of the leathers used for sealing the joints is reduced likewise, to reasonable proportions.

The system shown delivers a supply of water at constant pressure to a main which feeds the various presses. A motor, usually electric, drives a pump which supplies water to the pipe line. Pressure in the pipe line is regulated by a hydraulic accumulator consisting of a piston or "ram" working in a cylinder, the ram being loaded by weights of the necessary amount to regulate the pressure correctly. When the pressure in the pipe line rises to this value the ram and weights are lifted by it. When the ram has been lifted to the top of its stroke a lever attached to it opens valve V_2 to waste and the pump "idles." Non-return valve V_1 immediately closes, thus preventing a return of the water from the main pipe line. As the water in the pipe line is used by the presses the accumulator ram falls back. A spring or weight closes valve V_2 and the pump immediately replaces the water in the system. In the event of damage to valve V_2 or its operating gear, an emergency switch is provided, operated by the accumulator ram when this rises to higher than the normal position. This switch shuts off the motor and so stops the pump. The presses are connected to the pipe line through a main valve V_3, which valve enables repairs to be effected to each press and operating valve gear without shutting down the plant.

V_4 is the operating valve and admits water to shut the press. V_5 opens the press and allows the water to run to waste. Discharge rams are sometimes fitted to presses to force them open instead of relying upon the weight of the main ram itself; in such cases they are connected direct to the pipe line between V_3 and V_4. The pressure of such rams is always opposing the pressure of the main ram and allowance for this must be made in calculating the capacity of the press. By making the action of these discharge rams continuous, costly interconnected valves are not required and there is no danger of the main ram ever exerting its full pressure upon the accidentally closed circuit of the auxiliary rams, possibly bursting the cylinders. This danger is very real. Take the case of a 100-ton press working at a line pressure of 2,000 lbs. per square inch. Auxiliary rams of 10 tons capacity have been fitted. In the event of the main pressure opposing the closed circuit of the auxiliary rams a pressure of $100/10 \times 2{,}000 = 20{,}000$ lbs. would be built up in the cylinder of the auxiliary ram and its connecting pipe lines. Most firms find it more economical to avoid this than to cater for it.

Efficiency of Single Line Pressure System. (Method 2). The efficiency of this simplest of systems is very poor, and maintenance costs extremely high, while in addition the danger of accidental damage to molds is very great. Take the efficiency on the assumption of an average press of 50 tons capacity, fitted with an automatic

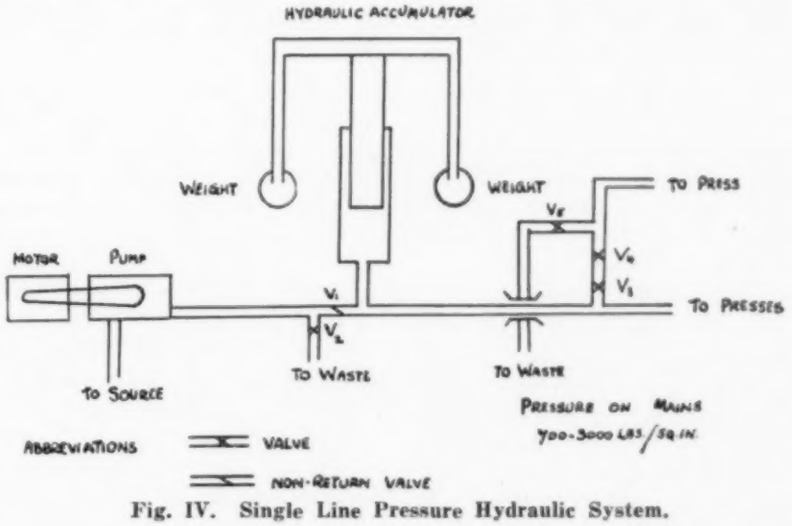


Fig. IV. Single Line Pressure Hydraulic System.

mold producing a simple article of the ashtray type. The press must open six inches for ejection of the molding and cleaning of the mold, etc. The energy used is 25 foot-tons, assuming that the pump, motor and press efficiencies are 100 per cent. The energy required will be that necessary to raise the ram to its work and then to do the work —say 5¾ inches idle lift and ¼-inch pressure stroke squeezing the material. If the weight of the press ram, platen, and mold totals 10 cwts., the actual work done will be $\frac{1}{2} \times 5\frac{3}{4} \div 12 =$ .239 plus the power stroke= $\frac{1}{4} \times 50/12 = 1.041$. Total work done = 1.28 foot-tons. Theoretical efficiency is consequently 5⅛ per cent. Roughly 95 per cent of the total energy of the system is wasted in frictional losses which show themselves in scored and pitted valve seatings, wear and tear on accumulator glands, etc.

Pumping Capacity

If on an average each 50-ton press is operated once every three minutes, then the pumping capacity must exceed 100 cubic inches per minute per press, assuming hydraulic pressure at one ton per square inch. A liberal factor should be allowed for leakage. This water contains 17,920 foot-lbs. energy, and it is therefore necessary to have at least one h.p. of available power for each 50-ton press, and a similar standby in case of breakdown.

Accumulator capacity is important, since this is required to smooth out peak loads. If it is equal to the volume of water used by the three biggest presses in the shop, it can be considered satisfactory. Thus at one ton per square inch and three 100-ton presses the capacity should be 1,800 cu. in., or say have 8-in. diameter ram with 3-ft. useful stroke.

It will be noticed that while the pumping capacity varies with the size of the system, the accumulator need not do so. In actual practice a very large system can be fed by a smaller accumulator than a small works. There is smaller risk of heavy peak loads in a well-ordered large works than in a small one.

This system has been described in detail, being typical of the practice of the day for accumulator-controlled hydraulic plants.

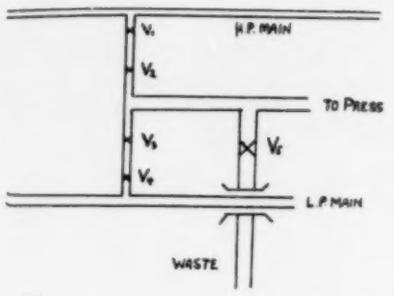


Fig. V. Press Connection for Two-line Pressure System.

Method 3.

Two-line pressure systems differ from single-line pressure systems in having the power plant duplicated. A low-pressure pump and accumlator supply 95 per cent of the water for lifting the presses to the work and a small pump and accumulator supply the remaining 5 per cent at high pressure.

Low pressures vary from 100 to 600 lbs. per square inch, high pressures from 2,000 to 6,000 lbs. Figure V. shows the piping arrangements to the presses from the mains, while the details of the motor accumulator and pump can be obtained by reference to Figure IV.

In Figure V. V_1 and V_4 are main valves, V_2 and V_3 operating valves for high and low pressure respectively. Small bore pipes and valves only are required on the high pressure side, as only approximately 20 cubic inches of high pressure water are used per stroke. Many firms dispense with a high-pressure pipe line, etc., and fit a hand pump to each press to be used after the low-pressure water has lifted the ram to its work. Discharge rams are always on the low-pressure mains and are operated independently by further valves.

The efficiency of this method is good, maintenance costs small and risk of damage to molds small. There are, however, more valves to control and the operation of the process is slower. The method is good for thermosetting compounds and hot molding generally, but is inclined to be cumbersome for thermoplastics and cold molding, especially when hand pumps supply the high pressure.

Method 4.

A very interesting method of recent introduction. Hydraulic power is supplied direct to the presses from a pump so constructed that the movement of the piston is controlled by the pressure in the pipe line. At full pressure the movement is zero, at low pressure it is at its maximum. The method is ideal for one press and possibly two, but although the makers of the pumps recommend six presses as a maximum for each pump, care must be taken that no two presses are likely to be operating at the same time, for the pressure in the pipe line (there is no accumulator) falls when there is a water demand. If, therefore, an operator is exerting the final squeeze in a press when another operator commences to close an adjacent unit on the same circuit, trouble will be experienced. The efficiency of the method is very high, the cost of the installation low, and risk of damage to molds almost negligible. A two-throw pump of the same type would do much to prevent the jerky motion of the press in the early stages of its travel.

Lynn A. Watt Made Asst. Vice-Pres. of Monsanto Chemical Works

THE Board of Directors of Monsanto Chemical Works, St. Louis, Missouri, at their recent meeting elected Lynn A. Watt as Assistant Vice President in charge of Commercial Research and Technical Service.

Mr. Watt has been associated with Monsanto for the past eleven years and will continue his work with development and technical problems.

NEWS *of the* INDUSTRY

Dr. Rossman Becomes Editor of Journal of the Patent Office Society

THE acceptance by Dr. Joseph Rossman, of the editorship of the Journal of the Patent Office Society has been announced in a recent (March) issue of that periodical. Our readers are all familiar with the very interesting and complete articles contributed to our pages by this well known writer, who is also one of our advisory editors.

Dr. Rossman is well known not only to patent attorneys and the corps of Examiners in the United States Patent Office, but also in academic circles. He entered the Patent Office as fourth assistant on Dec. 10, 1923, being appointed from Pennsylvania. He received his degree of B. S. in chemical engineering from the University of Pennsylvania in 1922; his LL.B. and M.A. from George Washington University in 1927, and his Ph.D. degree from American University in 1930. He is a member of the bar of the Supreme Court of the District of Columbia, the Court of Customs and Patent Appeals, and the United States Supreme Court. He is now in charge of electro-chemical work in Division 56 of the Patent Office. His recent book, "The Psychology of the Inventor" is now in press.

Cooley Appointed F. J. Stokes Western Representative

APPOINTMENT of Lloyd C. Cooley as their mid-western representative with headquarters at 75 East Wacker Drive, Chicago, has been announced by the F. J. Stokes Machine Co., Philadelphia, manufacturers of chemical and pharmaceutical machinery and special process equipment.

Mr. Cooley, a graduate of the Massachusetts Institute of Technology, is a chemical engineer of many years' experience. He was formerly with the E. B. Badger Co. and, also, the Swenson Evaporator Co.

Watson-Stillman Co. Buys Burroughs Company Assets

THE Watson-Stillman Company, Roselle, N. J. has purchased the assets and business of the Burroughs Company, Newark, N. J., who has for many years specialized in the design and building of Plastic Molding Hydraulic Machinery which includes its well known line of patented Tilting Head Presses, Rodless Hubbing Presses and Celluloid Working Machinery.

The Watson-Stillman Company will continue this line adding it to its own extensive line of similar equipment.

Du Pont Style Service Paris, France

By P. H. Chase

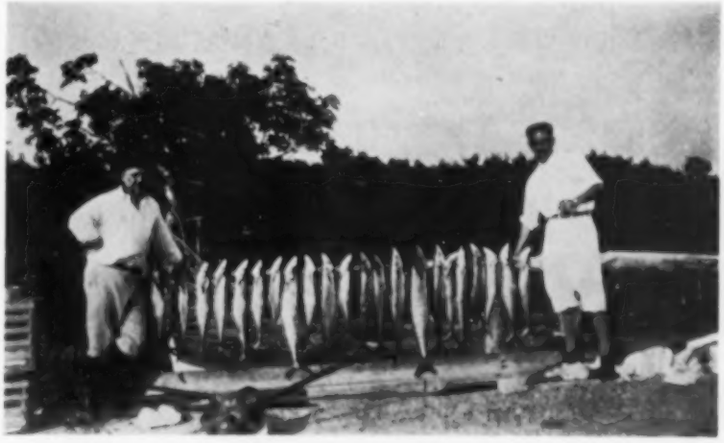
INTERESTING new uses for pyroxylin plastics are seen in many Paris shops. This material is being used not only for boudoir accessories, but for much of the fashionable new costume jewelry as well.

Rings are following the vogue of fancy necklaces and bracelets in this respect. New models designed by Blanchet are made entirely of transparent composition, with encrusted motifs in jade green, turquoise blue and black. The new wrist watch bracelets are in braided leather, fastened by Pyralin clasps.

Lightning bolts are a favorite decorative motif for the new toilet sets of plastic material. The motifs usually are in black over a pastel-colored background such as mauve, yellow or pink. Perfume bottles in crystal often are covered entirely by Pyralin cases in two contrasting colors. The latest models of cigar and cigarette boxes are in tuya wood with incrustations of a plastic material in shaded colors.

Burroughs and Rahm Form New Machinery Company

THE Burroughs Engineering Co., recently incorporated, with offices at 31 Clinton Street, Newark, N. J., has as designing engineers, Charles F. Burroughs and Walter E. Rahm. These men have had many years practical experience in designing, building and operating machin-



C. A. Kurz, Jr., Kurz-Kasch Co., spent two weeks at Miami, Florida, recently with his brother Walter. Their catch of kingfish shown is reason enough for their happy expressions.

ery for making thermo-plastic products, in fact they originated the varied types of presses and molds now generally accepted as standards for rapid production, accuracy and finish of pieces.

Burroughs Engineering Co.'s machinery will be built by the Southwark Foundry & Machine Co. (now a division of Baldwin-Southwark Corporation) from designs furnished by and under the supervision of Burroughs engineers. With Baldwin-Southwark Corp.'s modern equipment and facilities backed by nearly one hundred years in the machine field, Burroughs will be able to furnish machinery as to size and design, and make deliveries heretofore impossible. A complete line of Burroughs equipment designed by Messrs. Burroughs and Rahm is now available.

Mold designing and building so important in manufacturing thermo-plastic articles will be given, as in the past, intensive study by the new Company with a view to increased efficiency and accuracy. Their ability to furnish complete plants prevents divided responsibility and insures perfect co-ordination between the various production units.

Something New in Varnishes

THE varnish industry is in a period of radical readjustment. Methods and products which have stood the test of centuries are giving way before the synthetic creations of the laboratories. Although the art of the varnish maker is an ancient one, the basic raw materials at his disposal have, until recently, been confined to the gums and resins which occur in nature.

The first major departure from traditional practice and one which profoundly affected the industry as a whole, resulted from the development of low-viscosity nitrocellulose lacquers, the use of which expanded with extraordinary rapidity. Now the industry must adjust itself to the situation created by the

advent of several types of new synthetic resins.

One of the most interesting and important of these is a synthetic phenol resin which should not be confused with the other and older phenol resins used primarily in molding compounds and which are heat reactive, that is, which react on heating to become infusible and insoluble.

The new material is called by its makers "oil reactive" resin to distinguish it from other synthetic "oil soluble" resins and from natural gums and ester gums. Ordinary phenol resins are not soluble in the drying oils unless other materials such as rosin are added to promote solubility. The new "oil reactive" resin is easily soluble in Chinawood oil in any desired proportion. But of greater technical interest is the claim that there is a chemical reaction between the resin and the oil which may account for the accelerated hardening of the resin-oil mixture. This resin is therefore very different from the ordinary natural varnish gums, and, as might be expected, the quality of the coatings obtained with this new resin in oil is superior to the tung oil-gum varnishes hitherto available. Flexibility, rapidity of drying, durability, toughness, resistance to moisture and alkalies, all of which are fundamental and desirable requisites of a varnish, are reported greatly improved by the use of the "oil reactive" resin. Because of the accelerated drying effect on the oil, only a fraction of the usual amount of metallic drier is required, with the result that the usual tendency of a varnish to continue to oxidize destructively is greatly reduced.

The "oil reactive" resin may be used alone or mixed with other varnish gums. The addition of only 10% of the oil reactive resin to an ester gum varnish reduces the drying time from over seven hours to about three.

From *Industrial Bulletin* of
Arthur D. Little Inc.

Ornamental Effects Obtainable by Efficient Use of the Various Modern Plastics

Almost the entire gamut of human needs has been touched by plastic materials

By Charles W. Rivise

CONTINUING from page 159 of the March issue, we reproduce here a further number of patents showing the use of plastics for obtaining ornamental effects.

While the individual articles described are taken from patents, even those not particularly learned in chemistry and physics may read them with much profit—for many suggestions may be garnered therefrom, and thus the application of plastics to still other uses made possible.

We know of no place where similar information can be obtained with so little effort than from such compilations as this. The effort involved in collecting this data, is, however very great indeed.

41. C. Ellis 1,502,945; July 29, 1924. Filed April 3, 1922. An amber substitute suitable for beads, umbrella handles, pipe stems, cigarette holders is made by reacting upon a ketone such as acetone with formaldehyde in the presence of an alkaline phosphate such as sodium phosphate. Fillers such as wood flour, zinc oxide, cotton, linters, etc., may be incorporated.

42. W. G. Lindsay 1,506,014; Aug. 26, 1924. Filed Sept. 19, 1922. A decorated body is made as follows: The base of the article is cut or molded to shape or laminated from sheets, alternate layers of which contain a certain amount of white pigment and the remaining layers containing less. To whole or part of surface is applied a suitable solvent such as amyl acetate and then metallic silver scale is applied in continuous or discontinuous layers and a thin transparent sheet having amber or blue tint applied by means of solvent cement. The assembly is pressed and cut into various articles such as brush backs, combs, boxes or dice. The material for the base and covering may be cellulose nitrate or acetate or phenolic condensation product such as Bakelite.

43. C. Ellis 1,514,508; Nov. 4, 1924. Filed May 9, 1922. A composition suitable for buttons, combs, brush handles, umbrella handles, beads, pipes, cigarette holders, ink wells, tortoise shell substitute, etc., is made by condensing acetone and formaldehyde with an alkali such as sodium carbonate. Various modifying agents and fillers may be incorporated such as natural or synthetic resins, wood flour, asbestos, linters, fluxes, mineral powders, etc.

44. A. C. Buttfield 1,516,841; Nov. 25, 1924. This patent as well as Patent 1,516,842 discloses machines for mixing plastics of different colors so as to obtain variegated effects. In Patent 1,516,843 plastics of different colors are mixed, but incomplete blended and then subjected to temperature which prevents blending. Mixture is separated while still plastic into finally forced together to form a grained composition.

45. William W. Christmas 1,521,174; Dec. 30, 1924. Filed Feb. 21, 1923. A composition suitable for simulating the ornamental surfaces of natural woods, stones or fabrics and for molding into statuary, furniture parts, fancy goods, ornamental tile, wall slabs, etc., is made by mixing comminuted wood, water and a casein glue made of powdered casein mixed with hydrated lime. Modifying agents, fillers and dyes, etc., may be incorporated.

46. C. Ellis 1,529,056; Mar. 10, 1925. Filed Jan. 4, 1924. An ornamental coating for automobiles, metal furniture and articles of brass made from nitrocellulose mixed with a compatible synthetic resin such as phthalic glyceride rosin ester, toluidine-tung oil resin or furfural aniline resin. A large large number of modifying agents, fillers, pigments, solvents are mentioned.

47. A. Bartels 1,560,368; Nov. 3, 1925. Casein is extruded into separate masses of different colors, the masses are mixed, molded under yielding pressure, hardened and dried. Variation consists in making a casein block, cutting the block into pieces and hardening them separately.

48. E. Lauchner 1,578,327; Mar. 30, 1926. An ornamented article such as a handle, grip, latch for a door, knob, knife, shell, etc., is made by molding a mass of celluloid waste, casein, blood, horn, flour, etc., preliminarily under slight, applying color to the article and applying final pressure.

49. M. C. Beebe, A. Murray & H. V. Herlinger, 1,587,269; June 1, 1926. Filed Nov. 18, 1922. Invention is directed to the application of resins formed from mono-heterocyclic compounds comprising the furfurane-pyrrol-thiophene group to photography and to the decoration of metallic surfaces.

Among the examples given are furfuramide resin produced by condensing furfural and ammonia; furfuracetone resin which may be produced in situ on a surface or in a medium such as cellulose acetate, asphaltum or cumar resin by aid of an arc light; and furfural aniline resin produced with aid of iodine. Suitable sensitizers such as iodoform may be added.

50. C. N. Ferguson. 1,589,875; June 2,, 1926. Filed May 6, 1926. Filed May 5, 1922. Invention is directed to producing upon various kinds of objects as glass or opoque materials such as metal, a coating or layer containing one or more substances which will crystallize out during the drying of the coating and give the object treated the same appearance as if the object were molded or made with a crystalline substance. Method may be used to produce frosted glass effects, lettering upon glass, or surfaces of translucent or transparent glass shades.

Object to be treated is coated, sprayed with or dipped into any one of a number of different compositions, such as solutions of cellulose esters including cellulose nitrate or acetate, also celluloid or synthetic resins or lacquer or spiritous or oleoresinous varnishes and containing crystalline substances such as dichlorobenzol, benzoic acid, triphenyl phosphate or other substance which tend to crystallize out. One composition specifically mentioned comprises "Bakelite" lacquer composed of Bakelite, acetic ether, fusel oil and acetone oil, to which is added triphenyl phosphate.

51. H. N. Copeland. 1,593,525; July 20, 1926. Filed October 5, 1925. Article having ornamental striate surface such as knobs for radio instruments, steering wheels, switch housings, buttons and picture frames is made as follows:

Phenolic condensation product composition of granular form and intermixed colors preformed into tablet by cold pressing is placed in mold and pressure applied to make material flow. Direction of flow may be controlled to produce different striate, rayonnant or blurred effects by shape and size of tablet or by shape and contour of mold. For instance tablet may be annular and placed in mold on top of larger tablet, or in form of cylinder placed on smaller cylinder or the male portion of the die may have a recess in its surface to provide space to permit flow of composition.

52. I. Ostromislensky. 1,613,673; Jan. 11, 1927. Filed Jan. 29, 1925. A product having a nacreous lustre is made as follows:

A gum such as rubber, gutta percha, balata, etc., is dissolved in unpolymerized styrol or mixed therewith in solution and the mixture or solution is polymerized in the usual manner, as by means of heat.

53. A. Amann. 1,614,172; Jan. 11, 1927. Products suitable for ornaments, buttons, trimmings, cups, saucers and bases, furniture fittings and turnery-ware may be made as follows:

First any one of the following products is made:

1. Phenol and acetone are allowed to stand in the heat while concentrated hydrochloric acid is added. Product is dihydroxy-diphenyldimethane.

2. Phenol, methyl-ethyl ketone and hydrochloric acid allowed to stand in the heat and ether added. Product is recrystallized from benzene or ligroine and is dhydroxy-diphenyl-methyl-ethyl methane.

3. Phenol and dibenzol ketone are melted together and allowed to stand at room temperature with concentrated sulphur acid. Product is dihydroxy-diphenyl-dibenzyl methane.

4. P-cresol, acetone and concentrated hydro-chloric acid are allowed to stand at room temperature.

Any one of the above products dissolved in caustic soda, mixed with formaldehyde and precipitated with acid such as hydrochloric yields a resin.

Product of first example may be heated under slight pressure with caustic soda, paracetaldehyde and water and acidulated, or shaken with caustic soda, benzaldehyde and water and acidulated to give resins. Properties of resins depend upon acid used. Fillers such as chalk, barytes, magnesian marlstone, calcareous spar, clay, metal oxides, metal colors, infusorial earth, asbestos, cellulose, wood, peat, wood flour, paper flour, wool, wool waste and textile materials or mixtures thereof may be incorporated.

54 R. W. Seabury. 1,625,749; April 19, 1927. Filed July 21, 1922. A product suitable as a substitute for mahogany and other woods in furniture and cabinet work and also as electrical insulators especially in radio receiving sets or cabinets may be made in the following manner:

Non-impregnated but pervious sheets of paper or cloth or veneers of wood are applied to one or both sides of a fibrous base consisting of one or more sheets of paper, felt or cloth impregnated with a phenolic condensation product such as described in Patents 1,019,406 and 1,019,408 to Baekeland in the fusible or "A" condition and the assembly is consolidated between the platens of a hydraulic press so that the outer layers are impregnated from within outwardly. The platens may shape the assembly to any desired curvature or contour and may impress a design or configuration thereon.

The fibrous base may consist of several sheets of paper, some or all of which may be impregnated with other substances

such as asphaltic or bituminous bodies or resinous substance. Ordinary roofing paper, both impregnated and non-impregnated may be used as well as a laminated paper product wherein only the inner plies are impregnated with bituminous or asphaltic material.

55. C. M. Hargrave. 1,634,830; July 5, 1927. Filed Feb. 17, 1926. A substitute for light colored woods such as oak or mahogany particularly in the making of cabinets or radio panels is made as follows:

Several sheets of paper are impregnated with a potentially reactive fusible phenolic condensation product such as Redmanol or Bakelite varnish, dried, superimposed and consolidated by heat and pressure to form the body of the finished article. The sheets that are to form the surface of the article are printed or decorated, then dipped into Bakelite or Redmanol dissolved in alcohol containing one or more pigments and united to the body portion by heat and pressure. If desired the entire assembly may be consolidated simultaneously instead of as stated above. One or more of the body sheets may contain the pigments in order to prevent the darker shades from showing through. The pigment may be titanium oxide white pigment or iron oxide pigment depending upon the finish desired.

56. H. A. Cook. 1,638,529; Aug. 9, 1927. Filed Jan. 29, 1927. A plastic such as pyroxylin or celluloid incorporated with fish scales as described in Patent 1,607,624 in the form of slabs, rods, sheets or extruded tubes is subjected at an elevated temperature to the action of die having a highly uneven impression surface to upset the trend of the scales. The surface of the material may then be ground, buffed or repressed with a smooth die. The product is artificial mother of pearl.

This series will be continued in a subsequent issue of Plastics & Molded Products.

Porcelain is Simulated in New Line of Pyralin Novelties

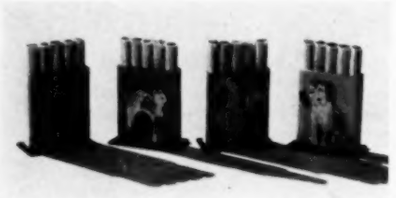
A NUMBER of interesting articles have recently been developed by the Du Pont Viscoloid Company. These include novelties for holding cigarettes, lady's hat brush, crumb tray and brush, comb cabinet for holding six dozen combs, and utility sets for the baby.

The red elephant on the lady's hat brush is weighted so as to stand upright. It makes a suitable bridge prize.

A new Pyralin baby set. Comb, brush and swab container included in novel fashion.

Crumb tray and brush made in attractive colors with contrasting floral designs.

Two novel items for bridge prizes and favors are boy and girl figurine cigarette stands in the forms of Huckleberry Finn and Becky of Tom Sawyer fame. These figures are of Pyralin and are fabricated in a way to simulate porcelain. They are being offered in a variety of bright color combinations.



Attractive combination place card and favor novelties which may also be used for holding cigarettes.

Other Bridge Prizes

Attractive combination place card and favor novelties which may also be used for holding cigarettes are made to represent miniature animals mounted on a background of Pyralin. They are packed four to a box and are available in the following color combinations: Silver elephant on red; yellow and black cat on blue; red and white rooster on Nile green; and brown and yellow dog on pink.

Another is in the form of a lady's hat brush. An elephant of red Pyralin is mounted on top of the brush and is weighted so as to stand upright.

A crumb tray and brush are also being offered in a variety of colors with floral decorations in a contrasting shade.

The baby sets are available in a number of designs in pastel pink or blue with floral decorations in the contrasting shade. They are made of Pyralin and have containers for cotton, soap, pins, baby gays and powder. One set is composed of comb, brush, and container for sanitary swabs.

A comb cabinet containing six dozen combs in various colors, including pastel tints, black, brown and Chinese red in plain and mottled effects, has also been developed by the Du Pont Viscoloid Company. The combs are in a variety of sizes and are individually wrapped in transparent Cellophane.

Boy and girl figurine cigarette stands in the forms of Huckleberry Finn and Becky Thatcher, to simulate porcelain.

Another baby set recently developed, including sanitary containers in traditional colors and floral ornaments.

A comb cabinet containing six dozen Pyralin combs, in various colors, each individually wrapped in Cellophane.

Manufacturing Expense

The second of a series of discussions on the accounting problems involved in the production of molded articles

By John J. Quigley, C. P. A.

WE usually consider all those shop expenses other than Direct Labor and Direct Material as indirect expense and have applied to such plant expenditures the term "overhead" or "burden". The thought conveyed seems to be that a mass of incidental expenses is loaded on the product, and that this expense made up of Rent, Depreciation, Insurance, Taxes, Maintenance, Indirect Labor, etc., bears no real relationship to production. Because of this it has been customary to dispose of "Overhead" in one of three ways:

1. By the direct labor cost method.
2. By the direct labor hours method.
3. By the machine hour method.

The direct labor cost method of distribution assumes that the ratio of Manufacturing Expense to Direct Labor is the correct basis for applying manufacturing expense or overhead to the product. The direct labor hour method assumes that process time is the basis on which this allocation should be made. The machine hour method also considers the time element, and this is the basis on which some of the molders assume that the overhead per press should be calculated in estimating the return or production value per press, per day or shift.

When the ratio of "overhead" to Direct Labor and Direct Material is low it is not so important or necessary to analyze these factors and the percentage on Direct Labor Method does not greatly distort the costs. However, the present day trend towards automatic and semi-automatic machines, and the consequent reduction or elimination of direct labor, focused attention upon Manufacturing Expense as a part of cost and we now attempt to break this expense down into Service Departments so that the service rendered to the product shall be the basis for distributing the greater part of the plant "Overhead".

In the Synthetic Plastics Molding Industry it is probably true that at this time the Direct Material consumed in products represents from 25% to 30% of factory cost, that Direct Labor represents about 25%, and that Manufacturing Expense represents 25% or more. By time study and accurate costing we endeavor to learn the direct labor cost of the job, through stores distribution we control material used and check the weight and estimated cost of material used on the job; but Manufacturing Expenses, which represents approximately one-third of the factory cost, is usually distributed arbitrarily as a percentage loading on Molding and Finishing wages.

Analysis of Overhead

Manufacturing Expense or Overhead may be analyzed in percentage of total, as follows:

Power		19% of overhead
Maintenance and Repairs		
Plant and Equipment	4%	
Molds	11%	15% of overhead
Preforming, Pilling, Weighing		10% of overhead
Inspecting		8% of overhead
Insurance		2% of overhead
Superintendence		14% of overhead
Small Tools & Supplies		6% of overhead
Packing and Shipping		7% of overhead
Depreciation		
Plant and Equipment	12%	
Molds	5%	
Buildings	2%	19% of overhead
		100%

If all of the above mentioned expense items bore exactly the same relation to the products the necessity for departmentalized service charges would not obtain. But these expense factors do not "burden" the products alike. Power used varies with the type and size of press; Maintenance of presses varies with the type and size of press; maintenance of molds varies with the type of mold, number of cavities, complexity of inserts, etc. And so we could go on and find that the ratio of overhead expense to the several products varies in a very wide degree. All manufacturing expenses are incurred for departmental service purposes and it is only necessary that we analyze the expenditures of a plant for the reasons thereof and the services rendered to the various products and then allocate the expenses of the Service Departments to the products benefited.

In the general run of Molding Plants we would expect to find the following service factors which could be classed as Service Department activities:

1 Service Department—Receiving and Inspecting Raw Material
- —1 Labor
- —2 Supplies
- —3 Depreciation — Receiving Equipment
- —4 Depreciation — Store Room Building

2 Service Department—Preforming, Pilling, Weighing
- —1 Labor
- —2 Repair Material
- —3 Supplies and Small Tools

—4 Depreciation — Pilling Machine and Weighing Equipment

3 Service Department—Maintenance Buildings
—1 Labor
—2 Repair Material
—3 Supplies and Small Tools
—4 Cleaning, Painting, Etc.
—5 Depreciation

4 Service Department—Maintenance—Presses
—1 Labor
—2 Repair Material
—3 Supplies and Small Tools
—4 Depreciation—Presses

5 Service Department—Maintenance—Molds
—1 Labor
—2 Repair Material
—3 Supplies and Small Tools
—4 Depreciation—Molds

6 Maintenance—General Shop
—1 Labor
—2 Repair Material
—3 Supplies and Small Tools
—4 Depreciation — Maintenance Tools

7 Service Department — Power Plant
—1 Labor
—2 Fuel—Coal, Oil, etc.
—3 Supplies and Small Tools
—4 Maintenance
—1 Repair Labor
—2 Repair Material
—3 Repair Supplies and Small Tools
—5 Depreciation—Power House Equipment
—6 Depreciation—Power House Building

8 Service Department—Tool Room
—1 Labor—Customer's Molds
—2 Labor—Own Molds
—3 Repair Labor — Customer's Molds
—4 Repair Labor—Own Molds
—5 Material—Customer's Molds
—6 Material—Own Molds
—7 Repair Material—Customer's Molds
—8 Repair Material — Own Molds
—9 Power
—10 Supplies and Small Tools
—11 Depreciation — Tool Room Equipment

9 Transportation
—1 Labor
—2 Supplies
—3 Repairs — Transportation Equipment
—4 Depreciation — Transportation Equipment

10 General Plant Overhead
—1 Labor—General Plant
—2 Supplies
—3 Maintenance—General Plant
—1 Labor
—2 Material and Supplies
—4 Power, Heat and Light
—5 Insurance
—6 Small Tools and Supplies
—7 Depreciation
—1 General Plant Equipment
—2 General Plant Building

11 Packing and Shipping
—1 Labor
—2 Supplies
—3 Repairs—Equipment
—1 Labor
—2 Materials and Supplies
—4 Packing Material—Cartons, Boxes, etc.

Labor—Distribution

The total amount of each payroll should be distributed from time cards. Employees may be grouped by numbers to facilitate checking of the payroll distribution. Direct wages—Molding, Finishing and Inspection—would be charged direct on the cost cards. All other wages would be classified and distributed to the Service Departments from time cards or foremen's payroll analysis, and the distribution of this expense would be checked to insure accurate records and the distribution of all payroll expenditures.

Repair Material and Supplies—Distribution

All repair material and supplies should be accounted for from Stores distribution. Material and Supplies should be requisitioned by foreman in charge of the job. Requisitions should indicate the work done as Construction in Progress, Repairs Presses, Repairs Molds, etc., and therefrom the supplies used and repair material charges should be made to the Service Departments.

To do all that as outlined above may seem an unnecessary addition to overhead expense, but the installation of an efficient system of control may mean merely the tieing in of the costs with the actual expenditures and the setting up of analytical accounting procedure. And the accounting of and for inventory assets such as repair parts, supplies, etc., is just as necessary and important as the accounting for any other current asset. The additional bookkeeping is negligible, for it is to be assumed that the Management requires for the conduct of the business such records as an analysis of payroll and a classification of material and supplies used so that control may be had of these items of expense and cost.

Plastics Industry Featured at the 13th Chemical Exposition

ONE of the most important features at the Thirteenth Exposition of Chemical Industries will be the displays of materials, machinery and finished products in the Plastics Industry. Since the last biennial Exposition, the industry has made gigantic strides forward and has created more interest than ever before in so short a period. Twenty-odd companies, all directly related to the industry, will have exhibits showing their latest developments.

Chief among these will be the plastic materials manufacturers, at whose booths, incidentally, the work of the various trade fabricators and custom molders will be seen. Moving into more prominent place in the Chemical Show will be the exhibit of Durez, and other General Plastics' products which will take their place on the main floor in Booth No. 71. An unusually attractive display has been planned for this product and a number of new uses of it will be included in the molded parts shown. Notable among them will be a number involving larger molded parts such as chair seats, table tops and radio cabinets. Also, a special section of the exhibit will be devoted to packaging. Durez has pioneered in the use of molding materials in this field.

The company's new products, of course, will be featured. The new Pastel shades and the standard molding compounds and some examples of their adaptation through practical molded pieces.

The Celluloid Corporation plans to exhibit Lumarith, Lindol, and H Scale. The Lumarith exhibit will consist only of articles which are actually be-

ing molded on a production basis. Many interesting applications have been developed and articles by the use of Lumarith.

Bakelite Corporation's display at this year's Chemical Show reflects a new angle of contact with the chemical industry. At previous shows this company has exhibited as a manufacturer of products which are produced by chemical reaction—yet these same products were applicable chiefly to non-chemical fields, electrical, mechanical, radio, etc. This year the development of new Bakelite resinoids adapted to the making of quick, durable, air-dry finishes puts the company in position to be of direct service to nearly all of the chemical industries which are based on the well known unit processes of chemical engineering.

The exhibit will be developed around a central panel showing the initial resinoids. Adjoining panels, some six in number, will reveal the application of the finished products in as many fields. Of course reference will not be limited to the chemical industry, but will include also such fields as Railroad and Marine Equipment, Automotive and Aviation, House Painting, Product Painting, etc.

Durite, the phenol-furfural resinoid and molding material made by Stokes and Smith, together with new articles manufactured from it, will be shown again. Molding powder filling materials will be shown by Becker, Moore & Co., Inc., manufacturers of wood flour. Base materials for the manufacture of synthetic plastics will be shown in the exhibits of American-British Chemical Supplies, Inc., Miner Laboratories, Eastman Kodak Company, and Hercules Powder Company. Continental Diamond Fibre Co. and the Fibroc Insulation Co. will be representative of the manufacturers of laminated plastic stock.

Machinery manufacturers to the plastic industry will include Arthur Colton Co. and F. J. Stokes Machine Co., makers of preforming presses; Baker Perkins Co., Inc., mixing machinery and Fred S. Carver, laboratory hydraulic presses.

British Industries Fair Pays Special Attention to Plastic Materials and Products

By A. C. Blackall
British Correspondent

THE 17th annual British Industries Fair, which was successfully held during February, was by far the largest and most representative display of British goods ever organized. It was, moreover, claimed to be the largest national trade exposition in the world. The total exhibiting area, counting all four sections in London and Birmingham, was 30 per cent greater than in 1930. The total frontage of stands was 15 miles. Three sections were held in London and one in Birmingham. London has been unable to build a home of anywhere near adequate size for the Fair, so rapidly has it grown. This year there were 2,370 exhibitors and they occupied 605,000 square feet of stands.

For the first time this year a special section was allocated at the Fair for molded products, with the result that both London and Birmingham shows had a more elaborate and interesting display of these products than was possible in any previous year. At Birmingham the section was described as covering "Synthetic Resins and all Accessories," and the display organized in this center afforded eloquent testimony to the extraordinary rate at which the molded products industry has expanded in Britain during the past five years.

The firm of Bakelite, Ltd., displayed a most interesting collection of molded and laminated products in Bakelite. One of the newest forms of this material is white panels suitable for bath rooms, etc., and handsome Bakelite laminated panels were used in the decoration of the stand. Bakelite is now being used in Britain for molding toys and a very interesting model of the late Sir Henry Segrave's car molded in one piece and fitted with Dunlop tires was on view. There was also a boudoir telephone hand set in delicate shades. Special asbestos material has recently been introduced by the firm and is claimed to withstand temperature up to 500 deg. F. Other recent introductions featured were a water-resistant material and a material for use where molded coverings on large metal inserts are desired. The flexibility of the latter product, which does not crack, allows for excessive contraction and expansion.

Synthetic resin materials, including a specialty known as Telenduron, were exhibited by Thomas De La Rue & Co., Ltd., London. This firm also featured Telenduron insulators, one of which was the power type designed to carry overhead cables. To meet local objections to the unsightliness of swan necks insulators or overhead lines the firm has introduced the Aylesbury pole, in which the line wires pass centrally through the poles, the holes being bushed with specially designed Telenduron screw insulators, the faces of which are corrugated to throw rain off from the centers.

Many Trade Molders Exhibit

The Birmingham firm of Brookes & Adams, Ltd., displayed its well-known Bandalasta ware and a number of new lines in Bakelite moldings for the automobile and radio trades, including radiator caps which are die pressed inside with Bakelite molded on. Attractively colored ash-trays, ready for fitting to the dashboard of a car, and cigarette and cigar boxes were also displayed.

The London firm of Lacrinoid Products, Ltd., exhibited an interesting collection of articles in Lacrinoid, or artificial horn, in artistic colorings which harmonize excellently with modern decorative schemes in the home. The door furniture was very attractive, especially in imitation ivory, and consisted of finger-plates and handles both in conventional and novel designs. Shop fittings and ship's fittings were featured in wide variety and one of the latest introductions of this firm was imitation marble, illustrated by a number of sample fittings.

Numerous products in Bakelite were displayed on the stand of Molded Products, Ltd., Birmingham, one of the newest lines being a lavatory seat molded in one piece in a material that does not deteriorate and has a permanently smooth hand polished surface.

The Brownie Wireless Co. (Great Britain), Ltd., London, a firm which makes molded insulators and other products in Bakelite, Beetle, fireproof, and plastic materials, showed a very interesting range of moldings, including clock cases, teapot handles and knobs, switch covers, airplane indicators, and radio accessories of all kinds—products indicative of the enormous growth of this class of business within the past few years.

The use of mica for electrical insulation and other purposes was the main feature of the stand of Micanite & Insulators,

Ltd., London. Micanite is a product built up from mica splittings which are bonded together with insulating cement under heat and pressure so as to form sheets or molded shapes.

Bakelite moldings were also attractively featured for electrical, radio, hardware and other uses on the stand of H. E. Ashdown (Birmingham), Ltd. One of the newest and most interesting articles on this stand was a photograph frame made in translucent material. Another product which has recently been marketed is the soap dispenser. Various examples of transformer cases and loud-speaker frames were on view at the same stand.

Birkys, Ltd., of Liversedge, exhibited a collection of moldings made in Elo, the firm's special product. Elo is a synthetic resin product. Elo variegated ware is an entirely new product which possesses all the beauty and brilliance of the finest pottery or porcelain. It is immeasurably stronger, however, and with ordinary handling is virtually unbreakable. Elo ware was featured in the form of trays, clock cases, knife handles, photographic frames, and many other articles.

The stand of Barrett & Elers, Ltd., London, was devoted to a display of moldings in ebonite and Bakelite, and also in the firm's own patent product, Belleroid. A new line introduced at the Fair was an adaptor for use in electrical fittings, made in Bakelite or Belleroid and specially designed as an improvement upon the ordinary bayonet cap adaptor. The design of the brass fittings ensures that the lead holes are always in the right position and fully exposed for the wire to enter. As the brass fittings cannot be unscrewed, they are not loosened when the wires are changed.

Numerous moldings produced from Rockite phenol and cresol powders were shown by Rockhard Resins, Ltd., London, on whose stand also was a Shaw molding machine demonstrating the actual molding process for some of the small articles displayed, including ash-trays, pin-trays and powder bowls. The machine molded articles in exactly 1½ minutes. Another exhibit was an injection machine for molding cellulose acetate powders, supplied by F. A. Hughes & Co., of London.

Another London firm, Ebonestos Insulators, Ltd., featured moldings in Bakelite, other synthetic resins, and cellulose materials. This firm molds for the trade in thermoplastic compositions of all kinds, specializing in non-hygroscopic moldings of high dielectric strength, and is one of the pioneer firms in the industry. The exhibits were both white and colored, and included accessories for the electrical trade, especially switch covers.

To all save those intimately associated with the industry, the exhibits of molded products this year proved a remarkable "eye-opener," and there is no doubt that the industry's brilliant display largely contributed to the increased attendance at the Fair this year. Attendance totalled approximately 150,000 trade representatives, exclusive of the general public.

Bevan, British Dyestuffs Corp., Discusses Phenolic Resinoid Tests at Joint Meeting in Manchester

AN interesting lecture on the development of uses for synthetic resins was delivered by E. A. Bevan, of the British Dyestuffs Corporation, before a recent meeting in Manchester, held jointly by the Institution of the Rubber Industry and the Society of Chemical Industry. Mr. Bevan said that resins prepared from phenol-formaldehyde combine to an extraordinary degree heat-resisting and electrical properties, coupled with easy molding. These have led to their use and rapid development as insulators in the electrical industry, being easier to produce and less brittle than porcelain on the one hand, and more resistant to heat than materials such as shellac, bitumen, or ebonite.

Until recently the application of these resins in the electrical industry has been somewhat limited by defects inherent in the material itself and also because of lack of uniformity. The figures quoted by manufacturers for the electrical properties of their molding powders are, in Mr. Bevan's opinion, of very little use, since the determination of these properties depends very largely on the methods and conditions under which the various tests are carried out. Realizing this, a systematic and painstaking research into the methods of electrical testing has been carried out in the laboratories of the British Dyestuffs Corporation.

This research has been conducted with a view to defining the operation of phenol-formaldehyde resins as electrical insulators, to discovering the causes of their failure and breakdown, and to finding means of improving the materials and extending their field of operation. In carrying out this research the requirements of the user of the resins as electrical insulators has been kept to the fore, so that as far as possible tests have been employed which indicate the electrical properties of the materials under actual sustained conditions of use.

The dielectric strength of phenol-formaldehyde molding has been determined under those conditions at which this strength is independent of the time in which the voltage is applied. The electrical properties of moldings exposed to controlled humidity have also been determined, but Mr. Bevan's lecture dealt with the effects of degree of cure, free moisture content of the powders, and of baking the moldings, on their electrical properties.

Synthetic Resins from Acetylene and Aldehydes

Resin formed from acetylene and sulphuric acid is condensed with aldehydes to form soluble, as well as insoluble and infusible products

HOWARD W. MATHIESON and Frederick W. Skirrow, of Shawinigan Falls, Canada, describe some interesting reactions and products in the nature of resins made from acetylene, phenol etc.

The U. S. P. 1,788,722; Jan. 13, 1931, as assigned to the Canadian Electro Products Co., Ltd., (Montreal), describes the process as follows:

It is known from Patent No. 1,707,940, filed July 25, 1921, that in presence of sulphuric acid and a mercury compound as catalyst, acetylene will react with phenols to produce a fusible and soluble resinous mass which under proper conditions may be hardened to infusibility and insolubility by heat or heat and pressure. The unhardened resinous material we hereafter term, for convenience, primary resin.

Basis of the Process

We have discovered that a superior resin may be made by reacting on a primary resin, as above, with an aldehyde, preferably acetaldehyde or a polymer thereof, the sulphuric acid group free or combined remaining in the primary resin serving to catalyse the aldehyde reaction. Should the acidic group be removed or neutralized in the primary resinous body, a fresh catalytic body must be added. The characteristics of the resulting product, hereafter, for convenience, termed an intermediate resin, may be greatly diversified by varying the amount of aldehyde and the time and temperature of the reaction. The product may be hardened to infusibility and insolubility merely by heat and pressure or by the addition of a hardening agent and subsequent heat and pressure treatment. The intermediate product may be fused or powdered, according to its nature, for admixture with fillers, colouring agents, hardening agents and the like or for moulding and may be dissolved in suitable solvents, with or without hardening agents, for impregnating material or for use as a varnish and may, after removal of the solvent be hardened to infusibility and insolubility by heat or heat and pressure.

The primary resin may be first treated for removal of mercury compounds but this is not absolutely necessary unless the final product is to have high dielectric strength. Also it may be treated for the removal of any excess phenol.

Example I

Approximately 13.8 parts (by weight) of acetylene are absorbed and the material formed in the reaction vessel is a heavy liquid which on cooling becomes solid or semi-solid. This is one form of the primary resin heretofore mentioned and is a fusible and soluble body.

The material may be now treated for separation of mercury compounds, either by settling, centrifuging, filtration or other means; although this step is not essential except where the finished product is intended for purposes requiring high dielectric strength.

One hundred (100) parts of the primary acetylene resin already described is mixed with thirty-five (35) parts of paraldehyde, the resin being first warmed to, say, 50° C. to render it more fluid and miscible, and the whole agitated for ten to fifteen minutes or until homogeneous. On the addition of the cold paraldehyde the temperature at first drops to about 35° C.; then a strong reaction sets in and external or other effective cooling is necessary, also vigorous stirring, to prevent the temperature rising too high and the reaction getting beyond control. Preferably the temperature is maintained between 35° and 50° C. until the initial vigorous reaction subsides, the time varying from fifteen to sixty minutes (approximately). The resulting product, which is one form of intermediate resin, is a heavy liquid which, however, can be readily poured and is convertible to a fusible and soluble or infusible and insoluble solid.

Cast Products Possible

The material may now be poured into a mould and placed at once in an autoclave and the pressure raised to 60 to 200 lbs. per sq. in. and the temperature to about 100° C. during approximately one (1) hour. High temperatures may be used with good results. At the end of this period the material will be found to have been converted into an extremely hard, elastic, infusible and insoluble resin of a rich brown color and that it has taken the form of the mould with exactitude and without loss of weight. Experiments have shown that a freshly made intermediate resin may be hardened at somewhat lower temperatures.

Example II

The process is carried out as detailed in Example I except that instead of thirty-five (35) parts of paraldehyde to one hundred (100) parts primary

resin, the amount is increased to fifty-five (55) parts of paraldehyde. The resulting intermediate resin is adapted for pouring into moulds. Practically the same results are obtained after the heat and pressure treatment, in that the material has properties similar to those of the final resin produced according to the first example.

Example III

The process is carried out as in Example I except that instead of thirty-five (35) parts of paraldehyde to one hundred (100) parts primary resin, the amount is increased to seventy (70) parts of paraldehyde. The material sets on final treatment to a hard, insoluble and infusible resin. This product is quite suitable for certain purposes although it does not possess the same degree of strength as the product produced according to Example I.

The liquid material first formed in the foregoing examples is the product of an incomplete reaction, which product, under heat and pressure and by the action of the acidic catalyst in the primary resin, is fully combined. This completion of the reaction in a mould is possible owing to the fact that substantially no water is liberated during the reaction.

It is to be noted that the infusible final product of these three examples resulting from the treatment of a liquid intermediate product may be obtained without the use of added hardening agents and that the property of infusibility is obtained by the heat and pressure treatment. In the following example it will be shown how a solid intermediate resin, which is fusible and soluble, may be produced. Such a resin may be hardened to infusible insoluble form either with or without the addition of hardening agents as will be later explained.

There are three other examples.

TECHNICAL ABSTRACT SECTION

A Review of Literature and Patents

Production of Artificial Masses from Casein. Otto Schmidt, Karl Seydel, Farbenindustrie Aktiengesellschaft. U. S. P. 1,775,175; Sept. 9, 1930.

Moistened casein is treated with a small percentage of cyclohexymonoethanolamine, the mass being intimately mixed. The further treatment is effected by moderately heating under pressure in any known or suitable manner, and an excellent artificial horn is obtained.

The cyclohexylmonoethanolamine may also be replaced by diethanolcyclohexylamine, or by a mixture of these two products or by their salts or acyl compounds.

1. As new articles of manufacture, highly transparent artificial masses comprising casein and a hydroxylated isocyclic aliphatichydroaromatic amine.

2. As a new article of manufacture, a highly transparent artificial mass comprising casein and cyclohexylethanol-amine.

3. As new articles of manufacture highly transparent artificial masses comprising casein and an amine selected from the group consisting of hydroxylated aliphatic-hydroaromatic amines and the salts thereof.

Cellulose Ethers. Max Hartmann, assignor to the firm of Society of Chemical Industry in Basle, of Basel, Switzerland. U. S. P. 1,777,970; Oct. 7, 1930.

Example 1

16 parts of cotton in the form of yarn are immersed in 160 parts of caustic soda solution of 18 per cent strength. After 3 hours, the goods are centrifuged to separate the excess of alkali solution and introduced into a solution of 7 parts of chloroethyldiethylamine in acetone, in which they are frequently handled for 3 hours; they are then washed with water and finally with dilute acetic acid, and then dried.

Example 2

16 parts of cotton yarn are mercerized under tension by means of caustic soda solution of 18 per cent strength. After the excess of solution has been separated the goods are introduced, in a state of tension or not, into an aqueous acetone solution of 9 parts of chlorethyldiethylaminehydrochloride, and maintained in constant movement, while the temperature is raised to 50-60° C. After 1 hour the excess of solution is drained away and the goods are washed with water until the alkaline reaction disappears. The mercerized cotton thus obtained is dyed by means of acid dyestuffs, such as tartrazine, very intensely and quickly. There are 17 examples in all.

Manufacture of Nitrostarch. Oscar Asa Pickett, of Kenvil, New Jersey, assignor to Hercules Powder Co., of Wilmington, Del. U. S. P. 1,779,825; Oct. 28, 1930.

1. A nitrated starch of relatively low viscosity and a high degree of solubility and stabilization prepared by the simultaneous swelling and nitration of starch of normal density.

2. The method of producing nitrostarch which includes treating starch of normal density with a mixture of acids, one of which is nitric acid, and water being such that the mixture will act to simultaneously swell and nitrate the starch.

3. The method of producing nitrostarch which includes treating starch of normal density with a mixture of acids, one of which is nitric acid, and water in excess of ten per cent, whereby the starch will be simultaneously swelled and nitrated.

White Resin and Process of Making Same. Boris N. Lougovoy, of Montclair, New Jersey. U. S. P. 1,779,551; Oct. 28, 1930.

Example A.—100 parts by weight of phenol, 25 parts urea and 160 parts of 40 per cent formaldehyde solution were boiled in an open flask in the presence of about 1 part of concentrated hydrochloric acid. After boiling for a short time a white mass separated and the boiling was continued for 15 minutes. When cold a white, rather brittle porcelain-like soluble resin was obtained. It was washed first with a 2 per cent solution of sodium carbonate and then with water. The yield of the resin was 178 parts. This resin was opaque and pure white in color. It was exposed to sunlight for a period of nearly two months and during that time there was no discoloration. The opacity of the exterior layers disappeared and a white glass-like coating resulted. This appears to be due to the removal of a small amount of moisture present in the mass.

Example B.—100 parts phenol, 25 parts urea and 100 parts of ordinary aqueous formaldehyde of 40 per cent strength were heated to the boiling point in the presence of approximately 2 parts of sulphuric acid of 50 per cent strength. The heating was carried out under a reflux condenser for a period of 15 minutes. A white resin resulted on cooling which did not harden as quickly as that described in Example A. It remained a semi-solid rubbery body for a few hours but gradually hardened on standing over night to form a mass having a porcelain-like appearance. The product was washed with sodium carbonate solution and water as in the case of Example A. On exposure of Sample B to sunlight for a period of nearly two months no discoloration was observed. It retained its same initial pure white appearance.

With reference to the solubility of these resins it may be noted that the foregoing are insoluble in water, ether or benzol. They are only very slightly soluble in hot methyl or ethyl alcohol. Slowly soluble in the cold and quickly on warming in acetone. They also are slowly soluble in the cold, and dissolve rapidly on warming, in certain solvent mixtures such as equal parts of acetone and methyl or ethyl alcohol. Likewise in equal parts of benzol and methyl or ethyl alcohol. The solutions obtained were colorless and perfectly transparent. A solution of resin in acetone and alcohol, and in benzol and methyl alcohol dissolved nitrocellulose. Linseed oil could be added to the benzol-alcohol solution in small amount. Tung oil did not mix as readily. Some of these solutions can be applied to wood or other surfaces to make light colored coating compositions. There are 3 other examples.

Material for Conversion into Cellulose Derivatives. Milton O. Schur and Royal H. Rasch, assignors to Brown Company, of Berlin, New Hampshire. U. S. P. 1,783,313; Dec. 2, 1930.

1. The step in the process of forming cellulose derivatives, which comprises treating a tissue of cellulose fibre with a caustic soda solution of mercerizing strength prior to conversion into such derivatives.

2. A process which comprises treating a tissue of wood fibre with a caustic soda solution of mercerizing strength, and then nitrating such tissue.

3. A process which comprises treating a tissue of wood fibre with a caustic soda solution of mercerizing strength, and then converting such tissue into a cellulose derivative.

16. A tissue especially suitable for conversion into cellulose derivatives, comprising mercerized wood fibre of a basic weight below 20 pounds.

Process of Treating Cellulosic Material. Camille Dreyfus, of New York, N. Y., and George Schneider, assignors to Celanese Corporation of America. U. S. P. 1,783,184; Dec. 2, 1930.

1. A process of treating cellulosic material which consists in subjecting the cellulosic material to a high degree of vacuum, introducing into the cellulosic material, while the same is under reduced pressure, a heated lower fatty acid and allowing the acid to act upon the cellulosic material until all portions of the latter are in suitable condition for esterification.

5. A process of activating cellulosic material which comprises subjecting the cellulosic material to a high degree of vacuum, adding to the cellulosic material, while the latter is under a vacuum, heated glacial acetic acid heated to approximately its boiling point and allowing the acid to act upon the cellulosic material for approximately one hour.

Manufacture of Mixed Esters of Cellulose. Charles S. Webber and Cyril J. Staud, assignors to Eastman Kodak Company, of Rochester, New York. U. S. P. 1,785,466; Dec. 16, 1930.

Two grams of cellulose acetate containing 34.1% acetyl is digested in a suitable flask containing a reflux condenser with 10 grams of mandelic acid (alpha hydroxyl phenyl acetic acid) at a temperature of 120 to 130° C. for a period of 3 1/3 hours the product upon being extracted and washed to neutrality, with ether results in a cellulose acetate mandelate which is soluble in chloroform, acetone. and 85% chloroform-alcohol, and is found to be soluble in ethylene chloride-methanol or other aliphatic halogenated hydro-carbons with the lower aliphatic alcohols.

Example 3.—50 grams of acetone soluble cellulose acetate containing 40% acetyl is dissolved in a solution containing 50 grams of c. p. salicylic acid and 250 c. c. of ethylene chloride. This solution is heated in a suitable container preferably equipped with a reflux condenser at a temperature of approximately 100° C. for a period of 260 hours. A mixed ester of cellulose containing both acetate and salicylate groups will be obtained which after precipitation and washing will be found to be soluble in 75% aqueous ethanol, 75% aqueous acetone, 75% chloroform-alcohol, and 75% ethylenechloride-alcohol. The mixed ester is found to be insoluble in acetone, 1-4 dioxan, water, and benzene-alcohol. Its melting point is 248 to 271° C. with an apparent acetyl content of 36.5%.

Stencil Sheet. Shinjiro Horii, of Tokyo, Japan. U. S. P. 1,785,260; Dec. 16, 1930.

A stencil sheet adapted for stencilizing by pressure, comprising a base of fibrous material coated with a coating composition consisting of a solution of esters of polysaccharides, tempering agents and stabilizing coloring substances which absorb the ultra-violet rays of the sunlight.

Manufacture of Nitrocellulose. Arthur Hough, John Roy Dufford, and William Clelland Leonhard. U. S. P. 1,785,030; Dec. 16, 1930.

2. A nitrated product prepared from material consisting essentially of vegetable parchment having as the basic substance nitrated parchmentized sheeted wood pulp, substantially free from matter which would dissolve in very dilute boiling ammonia water and which matter when so dissolving in dilute ammonia would produce a strong yellow color, such nitrated parchment also having excellent stability as shown by the usual nitrocellulose tests.

3. The process of making a nitrated product by parchmentizing sheeted wood pulp with sulphuric acid, washing the parchment substantially free from acid, then drying same and nitrating the dry pulp in the form of comminuted parchmentized paper in a nitration mixture, and dissolving out nitrated impurities, substantially as described.

Mixing Cotton Fibre and Bituminous Materials. Carl P. Nellis and Arthur H. Flower, assignors to the Inland Manufacturing Company, of Dayton, Ohio. U. S. P. 1,785,910; Dec. 23, 1930.

A process of forming a moldable plastic compound of bituminous material, fibrous material, and a finely divided filler material comprising: melting a lower melting point bituminous material, separately melting a higher melting point bituminous material, passing said first molten material in a relatively flat stream into a container and simultaneously distributing fibrous material upon said flat stream, passing said second molten material in a relatively flat stream into said container and simultaneously adding finely divided filler into said stream, and then kneading the combined materials to form a substantially homogeneous mixture.

Rubberlike Composition. Frederick C. Zobel, of Brooklyn, New York. U. S. P. 1,786,281; Dec. 23, 1930.

Take two parts of hard wood creosote oil such as that obtained by the distillation of beech, birch, or maple, also known as hard wood creosote oil, to one part of gum copal such as manila copal, heat the mixture until it becomes soluble and then precipitate the mixture into five parts of petroleum naphtha such as is known by the trade-name of varnoline. When stirred around, the mass coagulates and the desired product is then removed from the naphtha and washed with water for the purpose of removing all traces of naphtha. The kneading may be done by hand or in a regular rubber washing machine.

The product so obtained is a rubber-like mass whose color may vary from light canary color to an almost black. The product is very elastic, regaining its original form when stretched even though to a considerable degree. It is soluble in the usual rubber solvents such as carbon-tetrachlorid and carbon bisulphide and on evaporating in such a solution, the original rubber mass is obtained.

In acetone it slowly disintegrates, part of it dissolving, the other part staying in the acetone as a white, sticky solid which as long as wet with acetone easily pulls into threads, is elastic and in general shows rubber-like properties.

Resinous Composition. Theodore F. Bradley, of Westfield, New Jersey, assignor to Ellis-Foster Company, of Montclair, New Jersey. U. S. P. 1,785,930; Dec. 23, 1930.

Hard resin A

Seventy-four parts phthalic anhydride, 45 parts glycerol, 33 parts castor oil. The equivalent in grams of this formula was made in the laboratory in a glass flask using mechanical agitation and under suitable reflux condenser, carrying the temperature to 290° C. in 1½ hours. The resin obtained was pale in color, had an acid number of 20.6 and a softening point of 65° C. (ball and ring method). This resin was found to be soluble in a mixture of 60 parts butyl acetate and 40 parts butyl al-

cohol although not completely soluble in straight butyl acetate.

Resin B (resinous softener)

Forty-seven parts of glycerol, 98 per cent C. P., 30 parts of phthalic anhydride, 90 parts of castor oil. This resin was made in the same manner as resin A and produced an extremely soft resinous material having an acid number of 14.3 and which was freely soluble in butyl and ethyl acetates.

Soft resin C

Forty-seven parts glycerol, 98 per cent C. P., 111 parts phthalic anhydride, 140 parts castor oil. This resin was also made in the same manner as resin A and produced a rather soft, sticky resin having an acid number of 48.2. This product was freely soluble in ethyl and butyl acetates.

Acetylation of Nitrocellulose. Henry A. Gardner and Calvin A. Knauss, assignors to Henry A. Gardner Laboratory, Inc., of Washington, D. C. U. S. P. 1,786,989; Dec. 30, 1930.

Process which comprises adding ethylene dichloride to a solution of acetylated nitrocellulose in a solvent comprising acetic acid, and separating the resulting precipitated acetylated nitrocellulose, then after separating said precipitate, fractionally distilling the remaining solution to separate the acetic acid from the ethylene dichloride.

2. In processes for the production of acetylated nitrocellulose involving reacting the nitrocellulose with an acidic acetylating agent containing acetic acid and acetic acid anhydride, the step which consists in treating the resulting reaction mixture with ethylene dichloride.

Phonograph Disk. Hubert Laffon, of Paris, France. U. S. P. 1,787,484; Jan. 6, 1931.

Example 1

A sheet of cardboard is selected of the desired thickness (2 to 3 millimeters, for example) and before or after cutting to the shape and dimension desired, the said cardboard is impregnated with the following composition:

	Parts
Nitrocellulose	6
Triacetine	4
Damar gum	6
Ethyl acetate	30
Acetone	54

The disks thus obtained are then coated, by means of any process known to the art, with one of the two following varnish compounds:

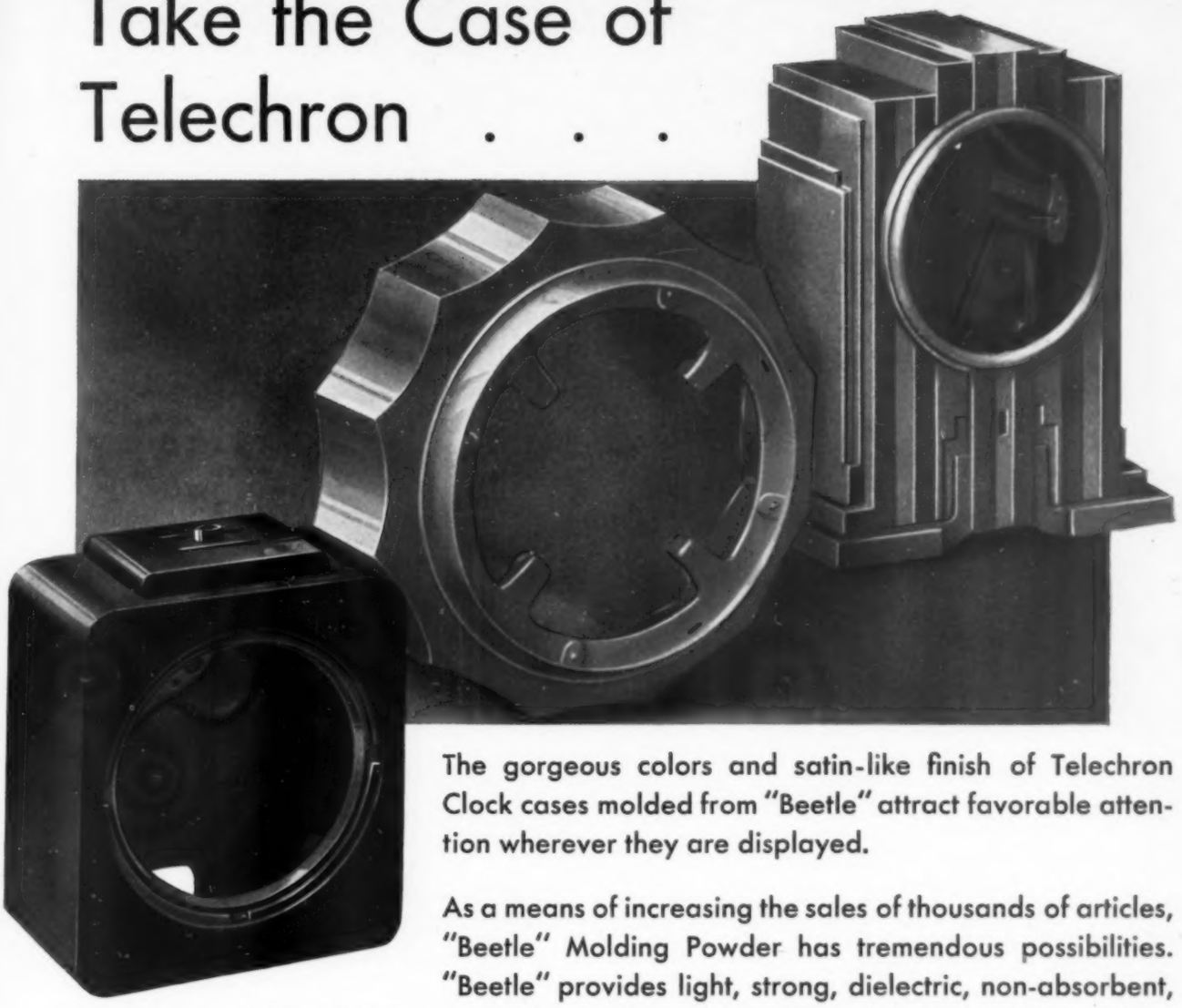
	Parts
1. Nitrocellulose	6
Triacetine	1
Tricresylphosphate	2
Butyl-acetate	40
Acetone	60

(with or without the addition of a loading material).

	Parts
2. Cellulose acetate	10
Triacetine	3
Triphenylphosphate	1
Acetone	86

(with or without the addition of a loading material).

Take the Case of Telechron . . .



These molders are producing a variety of "Beetle" moldings: American Insulator Co., New Freedom, Pa.; Colt's Patent Fire Arms Manufacturing Co., Hartford, Conn.; Diemoulding Production Co., Canastota, N.Y.; Kurz-Kasch Co., Dayton, O.; and Northern Industrial Chemical Co., Boston, Mass.

The gorgeous colors and satin-like finish of Telechron Clock cases molded from "Beetle" attract favorable attention wherever they are displayed.

As a means of increasing the sales of thousands of articles, "Beetle" Molding Powder has tremendous possibilities. "Beetle" provides light, strong, dielectric, non-absorbent, non-inflammable moldings. There is a choice of ten radiant colors and pastel shades. Leading molders are licensed and equipped to handle "Beetle" moldings and are steadily engaged in producing a variety of these moldings on a commercial basis.

Bring your product up to the minute. Speed up your sales. We will gladly send full information on "Beetle" and a complimentary copy of the 4-color "Beetle" booklet upon request.

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"Beetle"

Advertisers' Index

Classified Advertisement

Pioneers and Profits

(*Continued from page 196*)

had quite a vogue among the smart set. Beetle material is available in a number of colors including many delicate pastel shades.

Expert in molding procedure as well as material specifications our sales engineers have been able to render a splendid service to those pioneer manufacturers who are alert to the new color trend. The combining of two radically different materials resulted in one case of an unusually attractive two color container at a very attractive price.

It's easy to offer ways and means of curing the business ills of today. It's harder to find a panacea for all of them. But, based on the yearly statements of many companies we do find that profits are being made by the pioneers. Furthermore pioneering in business today consists of utilizing new and *proved* methods and materials. And in conclusion I would point out that the newest *proved* methods and materials are available through the progressive customer molder.

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Materials
for the Plastic Industries

And Now, In Closing:

WELCOME, Spring! . . . And if winter comes can business be far behind? . . . One of the visitors to Recto's new plant said he knew they moved to be near supplies . . . there is a planing mill next door! . . . Barber-Coleman are to put in their own, we understand . . . also that there are signed options to consolidate four molding plants . . . why only four? . . . Lou Sylvester is definitely through at American Record . . . John Trickey is with Carbide & Carbon . . . McCullough is with Bohn Aluminum . . . San Duro is through; now the Foss Mfg. Co. . . . Armour has moved the Albumen Department . . . proving blood isn't as thick as water . . . The first issue of the "Hot Platen", the molders' house-organ, says in commenting on the Regalite bankruptcy—"Evidently low priced material is not so profitable" . . . well: it depends . . . depends on whose material you are selling . . . and how about some spelling research? . . . The same Organ has 12 uses with u and 4 with o in the word "mold" . . . We may see a one-cent tube of Pepsodent in the Pullman wash rooms . . . If we told all the Buffalo jokes that the Molders asked us to, we'd be jobless . . . and if we told all the bad news, you'd be in tears!

WHAT is the particular advantage in infusible materials for many general applications? Take an inkwell: why should this article be made from a material that will never again be reworked? Does it have to resist heat or high voltage? There are materials, some of them newer to the market, that are truly thermo-plastic, and these may be of distinct advantage to the molder in the saving of flash for remolding. As a matter of course, infusibility has become of paramount importance for a wide variety of industrial work, and since it generally costs no more, it is fully acceptable. But what we react against very strongly is the use of such "infusible" articles in the contemporary press, which has only lately discovered that plastics exist, to show that all research has been devoted to the production of infusible resin. Frankly, we don't believe it.

Booth 436

THE writer of this last gasp of type has just returned from three weeks in the saddle around the western circuit—the saddle being either pullman (seldom) or coaches (usually). At every town, at every cross-road and hamlet, men are asking "How's business?" And the answer is "good—perhaps too good." The average plant is running about 70% of what they call "normal"—though even 1928 was over normal for the industry. Smaller plants are harder hit, perhaps, due to credit terms, strained borrowing capacity and a shortage of semi-executive personnel. For three large plants, February was the best month in history. and for one it was the second best. Admittedly this—almost "prosperous" business—is too rapid, too liable to flux, to be lasting in its effects. Yet the signs of revival are there, orders are being taken—and given; and slowly but surely the road is getting fewer "soft shoulders."

There is, however, one great, vastly important link in this chain of business revival and continuation. *Character*. Strange that it should need explanation, but it will need that to many of us. Character! the sort of business standard that says—"lets play (fair) ball"! Lord knows there are temptations to price cut beyond all reason, to exploit the friendship and trust of an individual for the gain of the company, to slap a man's back one minute and knife it the next! And it is being done, to many of us—by many of us! It isn't the right way and it doesn't pay dividends—in fact its cash value is nothing! All moralizing aside, if it's a bankroll that is wanted—for **permanent possession**—it can only be had honestly. Point out the man who is promoting what is not his own, and then ask him what **his** share is to be!

Without lying, without deceit—with an open battlefield and *Character*—this industry can be successful. But until that time comes (No, gentle reader, it isn't here yet) the industry generally will be chaotic and dubious of its profits.

DON'T forget the Chemical Exposition. It will be held in New York during the first week in May, and every plastician should set aside at least one day to do it justice. The previous Exposition had much that could help an eager production man save money on his product, and for molders, fabricators and producers there are many working displays that are often more than instructive. And don't forget—you are sure to find friends at Booth 436, just as you did two years ago.

Nature Is a Great Sales Manager!

WHEN nature wants something done she resorts to color. The delicate shades of flowers—the brilliant plumage of birds—the enticing colors of fruits—these are not accidental. Nature knows that nothing sells like color—and for a million years she has never changed her magic formula.

TODAY, LUMARITH, the newest and most colorful of all molding materials, offers many manufacturers a sensible method of increasing sales. Wherever this new, strong, colorful material has been adopted it has proved beyond all question of doubt that when you add beauty to your product you add volume to your sales.

LUMARITH can be molded into almost any shape. LUMARITH is non-shatterable, odorless, tasteless, non-inflammable and can be secured in an unlimited color range —transparent, translucent and opaque—plain or mottled. With LUMARITH exquisite color combinations are possible. Semi-precious materials such as jade, onyx, ivory, marble are easily simulated.

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